

# HISTORY

Of most

## Manual Arts,

Deducing the Original, Progress,  
and Improvement of them.

Furnished with variety of  
Instances and Examples, shew-  
ing forth the excellency of

## Humane Vit.

[ *by Thos. Powell, D.D.* ]

*Τέχνη κρατῦμεν, ὧν οὐδεὶς νικᾷμεθα. Euripid.*

L O N D O N,

Printed for *Henry Herringman*, and are to be  
sold at his Shop, at the *Blue-Anchor*, in the  
Lower Walk of the New-Exchange. 1661.

## To the READERS.

Gentlemen,



Though this Curious Piece you are here presented with, needs neither Preface nor Apologie for its publication, yet I perceive you are now grown to that delicacy or rather state in your Diet, you will not eat without a Taster. Give me leave therefore to acquaint you, That those to whose censure I permitted this Book, before I sent it to the Press, (and in whose Judgment I have some reason to confide) have assured me it hath in it those two Graces of Attraction, *Novelty* and *Excellency* in its kind; That the Title (which is a fault you may the more easily pardon, because not often committed) does modestly vail many perfections in the Work it self, in which you have several curious remarks on *Musique*, *Limning*, and other Noble Arts, as well as those that are properly termed *Manual*; and those too so handsomely treated of, with that excellency of Wit, that fair abundance and variety of

A 2                      judicious

*To the Readers.*

judicious reading, that roundness, strength, and dignity of Style, that you will imagine your selves even amongst the *Mechanique Arts*, to be conversant in the *Liberal*. The meanest things are ennobled here by the Expression; and all our Author touches he turns to Gold: So that for what concerns my self, I may confidently affirm, I have in the publication of this Treatise, perform'd an acceptable service to all ingenuous persons: And for the Author, I may adventure to say, He hath by this Work particularly honoured that Art of which he gives you so handsome an account; I mean, *The Invention of PRINTING*.

The

**The Principal Authors  
mentioned in this Work.**

*Abraham Gelnitz.*

*Aristotle.*

*Aldovrand.*

*Athanas: Kircherus.*

*Apuleius.*

*Archimedes.*

*Anl: Gellius.*

*Augustin.*

*Ælian.*

*Baker, Sir Richard.*

*Bartas.*

*Bacon Roger.*

*Bacon, Vic. St Albans.*

*Busbequius.*



# THE CONTENTS.

## Chap. I.

Ὠρολογικὴ: Or, The Invention of Dials,  
Clocks, Watches, and other time-tellers. page 1

## Chap. II.

Σφαιροποιητικὴ: Of some curious Spheres  
and Representations of the World. 14

## Chap. III.

Αὐτομάτο ποιητικὴ: Of sundry Machins  
and Artificial Motions, by Water, and  
Air. 24

## Chap. IV.

Γραμματιστικὴ: Or the Art and Mystery  
of Writing, with the Instruments there-  
unto belonging. 46

## Chap. V.

Τυπο-γραφικὴ: Of the Myserie of Print-  
ing: Also of Printing-Presses. 62

## Chap. VI.

Γεγραμμένη: Or the Art of Limning and  
Painting

## The Contents.

Painting: Also of the Plumary Art. 70

## Chap. VII.

Ῥαφαντικὴ: Or the Art of Spinning and  
Weaving; with the several materials of  
Garments amongst sundry Nations. 84

## Chap. VIII.

Μυσικὴ: Or the Original of Musique,  
and Instruments thereunto belonging:  
Also of the power and efficacy of Mu-  
sique. 102

## Chap. IX.

Γαλαρυτικὴ: Or the invention of Glass,  
and of sundry Glass-works. 133

## Chap. X.

Ναυτικὴ: Or the Invention of Ship-  
ping and Sayling: Also of the Mari-  
ners Compass. 144

## Chap. XI.

Ἡμερωτικὴ: Or the Art of Cicuration,  
or Taming of Wild Beasts. 164

## Chap. XII.

Τεχνο παίγνια: Or certain pretty Knacks  
and extravagancies of Art. 180

An

# An Index.

## A.

**A**Olipiles what, and of what use?  
 Arion waſted to ſhoar by a Dolphin.  
 Apelles's Maſter-piece.  
 Archimedes a great Mathematician and  
 Engineer.  
 Inventor of a ſelf-moving Sphere.  
 Amphitheaters made of Glaſs.  
 Argo, Jaſon's Ship.  
 Arts, perfected by degrees.  
 Arras work, where made?

## B.

Baboon taught to play on the Guittar.  
 Beaſts of all ſorts tamed.  
 delighted with Muſique.  
 Bear playing on a Tabor, and dancing.  
 Baſſas what, and of what uſe?  
 Boetius a rare Mathematician:  
 Boats made to ſayl under water,  
 made to ſail of themſelves,  
 made of a Tortoiſe ſhell,  
 made of Oſier or Wicker,  
 made of Paper or Reeds.  
 Biting of the Tarantula cured by Muſique.  
 Bellows fill'd with water to blow fire.  
 Cambricks

# The Index.

## C.

Cambricks made at Cambray.  
 Coco-trees the great benefit of them.  
 Crow taught to flye at Partridges.  
 Clocks of curious workmanſhip.  
 Chains very curious made by Vulcan.  
 Corn. van Drebbel a great Mechanique or  
 Engineer.  
 Curracles deſcribed by Lucan.  
 Cicuration, or taming of Wild Beaſts.  
 Chriſtal Glaſs impatient of heats.  
 Cloth made of dowe growing upon a ſhell-  
 fiſh,  
 made of incombustible flax.  
 made of a hairy ſtone called Trichitis  
 or Salamanders wooll,  
 made of the Barks of Trees,  
 made of Camels hair, called Camelots,  
 made of wooll fallen from the ſky.  
 Cloth made clean by throwing it into the  
 fire.  
 Coaches going with Sails.  
 Chariots drawn by Lions,  
 by Tygers,  
 by Staggs,  
 by Dogs,  
 by Eſtriches,  
 by Elephants,  
 moved by Sails.

Dials

D.

Dials *invented by Anaxamenes, made with Heliotrope flowers.*  
 Dolphins *made use of to catch fish.*  
 Deer *used for the Saddle.*  
 Dove *artificial made to fly.*  
 Devil *hater of Musique.*  
 Damask-works.  
 Dancing Horses.

E.

Eagles *taught to fly at fowl.*  
 Eagle *artificial made to fly.*  
 Eloquence, *the great force and power of it.*  
 Erasmus *his Spherical Ring.*  
 Elephants *taught to dance, and how.*  
     *Very docil, and taught to perform*  
     *sundry Offices.*  
 Estriches *put to draw a Coach.*

F.

Flavio of Amalphi, *first inventor of the*  
     *Mariners compass.*  
 Feather-works *of rare Art.*  
 Fish Nautilus, *first Type of a Ship.*  
 Flea *with a chain about her neck.*  
 Fossil and fusil glasses.  
 Fishes *affected with Musique.*

Glass

G.

Glass *where made, and whereof.*  
 Glass Galley.  
 Glass chains.  
 Glass Organs.  
 Glasses *made to burn Ships.*  
 Glass *made malleable.*  
 Grograms *made of Coats hair.*  
 Garments *made of feathers.*

H.

Hours, *so named from Horus Apollo.*  
 Horses *taught to dance.*  
 Hydraulick Organs,  
 Heavens *artificial.*

I.

Instrument *of perpetual motion invented by*  
     *Van Drebbel.*  
 Incombustible Flax.  
 Iron Spider *made to move like a natural*  
     *one.*  
 Iron mill *that one could carry about him,*

L.

Leopards *taught to run at Deer like Grey-*  
     *hounds.*  
 Linnen *the general wear of Priests.*  
 Limning or Painting *how begun.*

Letters

## The Index.

Letters *invented by the Phoenicians.*  
 Lions *tamed for several offices.*  
 Loadstone *described by Claudian,*  
     *very useful by Land and by Sea,*  
     *comparable to all the pretious*  
     *stones in the world.*  
 Locks *of curious work.*  
 Lute, *why called Testudo.*  
 Looking-glasses, *some strange feats to be*  
     *done by them.*  
 Load-stars, *which they be.*  
 Looms *weaving Webs of themselves.*

## M.

Musique *the first Invention of it,*  
     *the power and efficacy of it,*  
     *upon men and beasts,*  
     *upon good and bad Angels,*  
     *in curing diseases of body and*  
     *mind,*  
     *in corrupting manners, or reform-*  
     *ing.*  
 Memnon's Statue *Musical.*  
 Mariners Compass, *by whom invented.*  
 Mills of Segovia, Tholouse, and Dantzick, *admirable.*  
 Mill of Iron *that one could carry in his*  
     *sleeve.*  
 Monkey *very skilful at Chess-play.*

Moon

## The Index.

Moon *inhabited.*  
 Mosaic work, *what it is.*  
 Myrons brazen Cow.

## N.

Navigation *a bold Art.*  
 Navigation *very imperfect before the in-*  
     *vention of the Compass.*  
 Navigation *by land, and under water.*

## O.

Organs *tuned by the motion of water,*  
     *by the Sun-beams.*  
 Opfidian glass, *what kind.*  
 Orpheus *his powerful Musique.*  
 Ovid's Pen *preserved.*  
 Organ Pipes *made of Glass,*  
     *made of Alabaster.*  
 Otters *taught to drive fish into the net.*

## P.

Parrot *taught to sing the Gam-ut.*  
 Painting or Limning *a useful and delight-*  
     *ful Art.*  
 Plumary art *what it is.*  
 Pictures *made of feathers.*  
 Pictures *highly valued.*  
 Panthers *tamed for hunting.*  
 Picture *called Deaths-dance.*

Printing

## The Index.

Printing, where invented.  
Printing- Presses.  
Paper made of seggs or rushes,  
made of lint and rags.

### R.

Rare shews on the Roman Amphitheaters.  
Roger Bacon a great Mathematician.  
Reversus, a fish used to catch fish withal.

### S.

Sea-dial; See Mariners Compass.  
Spiders in the Summer Islands making silk.  
Spider of Iron moving like the natural.  
Sybarits horses taught to dance.  
Sailing Coaches.  
Sailing by stars before the invention of the  
Compass.  
Sailing in Taprobana by the direction of  
birds.  
Ships with Gardens and Orchards on the  
tops.  
Ship first invented by Jason among the Gre-  
cians.  
Silk-worm first brought into Europe.  
Sea-silk.  
Silk whether any vegetable or growing upon  
trees.  
Spiders tissue admirable.

Spit

## The Index.

Spit to turn by a Sail, by the motion of Air.  
Spheares representing the heavenly bodies  
and motions.  
Specular stone what it was.  
Statues vocal.  
Salamanders wooll, what it is.

### T.

Thermo-meters, or Weather glasses.  
Travelling by the direction of Stars.  
Tortoise shell used for a house and a boat.  
Tortoise shell first pattern of a Lute.  
Triton artificial, sounding a Trumpet.  
Tredskins Ark.  
Tyrians the best Navigators.

### V.

Velvets and Sattins made of the bark of the  
Palm tree.  
Vulcans chains very subtile.  
Venus rising out of the Sea, was Apelles  
his master-piece.

### W.

Waggon and Oxen of glass, that a Fly  
could cover with her wings.  
Weaving by whom invented.  
Water-works of sundry sorts.  
Watches made in the collet of a Ring, hang-  
ing at Ladies eares.  
Wea-



## The Index.

1137 Weather-glasses of what use.

Wind-motions, sundry instances.

Writing an excellent invention.

Writing in lead and brass,  
in rocks and stones,  
in leaves and barks of trees,  
in cedar and box,  
in waxen tables.

Writing in short hand, by whom invented.

Writing with the feet.

Wooll, whether growing upon trees.

Wooll rain'd from the sky made into cloth.

Wooden Palace of Henry VIII.

## Z.

Ziglo-graphy what, and of what use.

Zeuxes his picture of an old woman deceived by a painted curtain.

CAP.

(1)

CAP. I.

ΩΡΟΛΟΓΙΚΗ:

OR

The Invention of Dyals,  
Clocks, Watches, and other  
Time-tellers.

**T**ime is the most precious commodity that man doth enjoy; because time past, cannot be revoked; and time lost, cannot be repaired.

*Damna fleo rerum, sed plus fleo damna dierum.*

*Rex poterit rebus succurrere, nemo diebus.*

Lost Treasure I bewail, but lost Days  
more;  
Kings can give treasure, none can days  
restore.

C

There-

Therefore men should set a due estimate upon this commodity, and expend it thriftily and wisely: to which purpose the ancient *Sages* of the world have ingeniously devised a way to divide even the Natural day (which is one of the least measures of time) into hours, and those into quarters and minutes, and into lesser Fractions then they; that by this *Horometry*, they might mete out and proportion business to the time, and time to the business in hand. The name of *Hora*, Hours, came from *Horus Apollo*, an *Ægyptian Sage*, who first divided the day into those portions we call hours, as *Macrobius Saturnal. l. 1. cap. 21.* informs us.

In *Ægypt* there was a Beast of a very strange kinde, called *Cynocephalus*, kept in the Temple of *Serapis*, which in the time of the two *Æquinoxes*, did make water twelve times in a day, and so often in the night, and that regularly, at even spaces of time; from the observation whereof they divided the natural day into twenty four hours; and that Beast was their Clock and Dial, both to divide the day, and reckon the hours by. This gave a hint (belike) to the *Clepsydra*, or water-glasses (invented by *Ctesibius* of *Alexandria*)

*dria*) which distinguished the hours by the fall or dropping of water, as *Clepsammidia* or Sand-glasses did by the running of sand: *Miro modo in terris aqua peragit, quod Solis flammens vigor desuper moderatus excutrit.* *Cassiod. de Divin. Læction. c. 30.* And to shew they owed the invention to this creature, they used to set one carved on the top of these Water glasses, as may be seen in *Kirker in Mechanica Ægyptiaca*. The Heavens are the grand universal clock of the world, from whose incessant and regular motion, all times here below are distinguished and measured.

And because time is in continual flux or motion, and passes away with silent feet, insensibly and invisibly, therefore it was necessary to invent a way how to make the motion of time (according to the several divisions thereof) visible to the eye, or audible to the ear, that it should not steal away without our notice; but that we might tell and count its steps and stealth.

*Anaximenes* the Philosopher was the first that took an account of time by shadows projected on the ground, and which changed and moved according to  
C 2 the

(4)

the motion of the Sun, from which observation he devised Sun-dyals called *Scloterica*. Though *Vitruvius* ascribes the Invention to *Berosus* the Chaldean, who framed *Vasa Horoscopa*, and *Epicyclia excavata cum stylo* (as he terms them) certain hollow Dyals (like dishes) with Stiles or *Gnomons* erected in the middle. At *Rome* they counted the day (for a long time) by the shaddow of a brazen Obelisk or Pillar: when the shaddow of the pillar did fall in such a place, they did account it Noon or Mid-day, and then a Cryer was appointed to cry it about the Town; So likewise at Evening, when the shaddow fell in such a place, the Cryer proclaimed *horam supremam*, the last hour of day: other distinctions they had none as yet.

The *Nafican Scipio* was the first that brought the use of Water-glasses amongst them, and distinguished the hours of day and night; until his time, *Populo Romano indiscreta lux fuit*, saith *Pliny*, the Roman people had no division of hours; as the Turks (at this day) have no distinction of their ways by miles, nor of their days by hours, as *Busbequias* relates *Ep. 1. Legat. Turc.* In *Plautus* his time, there was

(5)

was great store of Sun-dyals in *Rome*, which he calls *Solaria*; for in one of his \* Comedies, he brings in an hungry servant complaining of the number of them, and cursing the Invention in these expressions.

Called *Bæoria*, which is lost: but these words are cited by *Aul. Gellius* cap. 3.

*Ut illum Dii perdant qui primus horas repperit,*

*Quiq; primus adeo statuit hic Solarium,  
Qui mihi comminuit misero articulatum diem.*

*Nam me puero venter hic erat Solarium  
Multum omnium istorum optimum ac verissimum.*

*Ibi iste monebat\* esse, nisi cum nihil erat. i. Edere  
Nunc etiam quod est non estur nisi Soli labeat*

*Itaque jam oppletum est oppidum solaris  
Major pars populi, aridi reptant fame.*

Among the Persians every ones belly was his Dial: so it was in *Ammianus Marcellinus* his time: But these ways of *Horometry* were rude and imperfect. By Water-glasses the account was not regular: for from the attenuation and condensation of the water, the hours were shorter or longer, according to the heat or coldness of the weather. Then for the

C 3

Sun

( 6 )

Sun-dyals they did serve but at some times, only by day time, and then not alwaies neither, but when the Sun shined. To remedy these defects, some wits did cast about how to distinguish the hours of the night as well as of the day; and of cloudy days as well as of serene and clear. Hereupon some Engines and contrivances have been composed by *Trochilique* art, or the artifice of Wheels; which by the motion of several Wheels, and Springs, and Weights, and counterpoizes should give an account of the time, without Sun or Stars; and these were called *Horologes*.

*Severinus Boetius* a worthy Patrician of *Rome*, and a most eminent Philosopher and Mathematician, was the first (that I finde) that contrived any Engine of this sort: *Theodoricus* King of the Goths wrote a Letter to the said *Boetius* to beg one from him for to bestow on his brother in law *Gundibald* King of *Burgundy*; in which Letter he calls it, *Machinam mundo gravidam, cælum gestabile, rerum compendium*: A portable heaven, and a compendium of the heavenly Sphears, as *Cassiodorus* hath it, who was the penman, in the first book of his *variae lectiones*.

Aaron

( 7 )

*Aaron* King of *Persia* sent such an Instrument for a present to *Charls* the great King of *France*, in the year 804. it was made of Copper, & *Arte Mechanica mirifice compositum*, saith *Hermannus Contractus*, who doth describe the same more largely in his history.

Of these *Horologes*, some are *mute*, and some *vocal*: *Vocal* I call those which by the sound of a Bell striking at just intervals and periods of time, do proclaim the hour of the day or night, yea, even half hours and minutes; by the benefit whereof, even blinde men that can see neither Sun nor shaddow, and those that lie in their beds, may know how the time goes, and how long they have bin there, although they slept all the while; and are properly called *Clocks*, from the French word *Cloche*, a Bell.

*It rota nexa rotis, tinnulaque æra sonant.*

*Mute* *Horologes* are such as perform a silent motion, and do not speak the time of the day, but point at it with an *Index*, such as are *Sun-dyals* and *Watches*; the last of which go by springs and wheels, as the others by weights and wheels: yet

G 4

some

some of these are vocal too, and carry Bells and Alarums, to signifie unto us the stealth of time. Many carry Watches about them that do little heed the fabrick and contrivance, or the wit and skill of the workmanship; as there be many that dwell in this habitable world, that do little consider or regard the *wheel-work* of this great Machin, and the fabrick of the house they dwell in. A King of *China* upon his first seeing of a Watch, thought it a living creature, because it moved so regularly of it self, and thought it dead when it was run out, and its pulses did not beat.

The wit of man hath been luxuriant and wanton in the Inventions of late yeais; some have made Watches so small and light, that Ladies hang them at their ears like pendants and jewels; the smalness and variety of the tools that are used about these small Engines, seem to me no less admirable then the Engines themselves; and there is more Art and Dexterity in placing so many Wheels and Axles in so small a compass (for some French Watches do not exceed the compass of a farthing) then in making Clocks and greater Machines.

The

The Emperour *Charls* the fifth had a Watch made in the Collet or Jewel of a Ring; and King *James* had the like: and one *Georgius Caput. Blancus*, or *George Whitehead* was expert at making such knacks at *Vicenza* in *Italy*, as *Schottus* tells us in his *Itinerary* of that Country.

*Andrew Alciat* the great Civilian of *France*, had a kinde of a Clock in his chamber, that should awake him at any hour of the night that he determined, and when it struck the determined hour, it struck fire likewise out of a flint, which fell among tinder, to light him a candle: it was the invention of one *Caravagio* of *Sienna* in *Italy*.

In some Towns of *Germany* and *Italy*, there are very rare and elaborate Clocks to be seen in their Town-Halls; wherein a man may read *Astronomy*, and never look up to the skies.

*Sydereos vulsus, Cantataq; vatibus Astra,  
Non opus est Cælo querere, quare domi.*

So *Grotius* of these Globes.

In the Town-Hall of *Prague*, there is a Clock that shews the annual and periodical motions of the Sun and Moon, the names

names and numbers of the moneths, days and Festivals of the whole year, the times of the Sun-rising and setting, throughout the year, the Æquinoxes, the length of the days and nights, the rising and setting of the 12 Signes of the Zodiack: The age of the Moon with its several Aspects and Configurations; as *George Bruy* describes it in *Theatro Urbium*.

But the Town of *Sraesburgh* carries the bell of all other steeples (of *Germany*) in this point. A Scheme of the *Strasburg* clock you may finde in *Coriats Travels*, with a full description thereof: it was made by one *Conradus Dasypodius* a German, and Professor of the Mathematicques in that City.

One *Linus* a Jesuite of *Liege*, and an Englishman by birth (as *Kircher* tells me) had a Phial or Glass of water, wherein a little Globe did float, with the four and twenty Letters of the Alphabet described upon it, and on the inside of the Globe was an Index or Stile, to which the Globe did turn and move it self, at the period of every hour, with that letter which denoted the hour of the day successively, as though this little Globe kept pace and time with the heavenly motions,

*Mich. Ne-  
ander  
Greg.*

*L. de Ma-  
gnete.*

motions, *Gassend. de vita Peyresci.*

*Kircher* above mentioned had a Vessel of water, in which, just even with the height and surface of the water, the twenty four hours were described; upon the water he set a piece of a Cork, and therein some seeds of a certain Heliotrope flower, which (like the flower it self) would turn the cork about, according to the course of the Sun, and with its motion point the hour of the day, *ibid.*

In that famous Stable of the Duke of Saxony at *Dresden*, there is a Room furnished with all manner of Saddles; among the rest, there is one that in the Pommel hath a gilded head, with eyes continually moving; and in the hinder part thereof hath a Clock, as *M. Morison* (an eye witness) relates in his Travels.

Of a portable Clock or Watch, take this ensuing Epigram of our Countryman *Thomas Campian, de Horologio Portabili.*

*Temporis interpres parvum congestus in orbem.*

*Qui memores repetis nocte dieq; sonos.*

*Ut semel instructus jucundè sex quater horas*

*Mor.*

*Mobilibus rotulis irrequietus agis.  
Nec mecum (quocunq; feror) comes ire  
gravaris  
Annumerans vite damna, levansq; mea:*

Translated  
H. V.

Times-Teller wrought into a little  
round,  
Which count'st the days and nights  
with watchful sound;  
How (when once fixt) with busie  
Wheels dost thou  
The twice twelve useful hours drive  
on and show.  
And where I go, go'st with me with-  
out strife,  
The Monitor and Ease of fleeting life.

But the exactest Clocks and Watches  
that are, are defective, and want correcti-  
on; for in Watches, the first half hour  
goes faster then the last half, and the se-  
cond hour is slower then the first, and the  
third then the second; the reason where-  
of is, because Springs when they are  
wound up, and then begin their motion,  
move faster in the beginning then in the  
ending; as it is with all violent motions.  
But in Clocks it happens contrary; the  
last half hour is faster then the first, be-  
cause

cause the weights by which they move,  
move slowly at first, as all ponderous  
things do, but accelerate their motion  
when they draw nearer to the earth. Be-  
sides, the lines or cords by which the  
weights do hang (being drawn out into  
some length) add some weight to the  
plummetts, and consequently some speed  
to the motion. Both which inconveni-  
ences *William Landgrave of Hessen*, and  
*Tycho Brahe* took into consideration how  
to rectifie, as *Tycho* relates; but how they  
sped in the enterprize, he doth not tell us.

---

C A P.

## C A P. I I.

Σ Φ Α Ι Ρ Ο - Π Ο Ι Η Τ Ι Κ Η :

O R,

Some curious Spheares and  
Representations of the  
World.

**A**RCHIMEDES of Syracuse was the greatest Mathematician and the rarest Engineer that was in his time, or hath been ever since (as 'tis believed) both for the *Rational* and *Chirurgical* part, the *Theory* and the *Practick* of the Mathematicks. *Cicero* calls him *Divinum ingenium*, 2<sup>o</sup> *de natura Deorum*. He was not only, *Cæli Syderumque Spectator assiduus* (as *Livy* speaks of him) a diligent Spectator of the heavenly Orbs and their Motions; but also *Cyclorum & Staticorum indagator acerrimus*, as the same *Livy*, a great Experimentator

mentator and devisor of Mechanical Motions and Inventions. He was the first, *qui stellarum errantium motus in Spharam illigavit*, saith *Cicero*, 1<sup>o</sup> *Tusc.* that made a Sphear and an artificial heaven, wherein he did represent the rotations and revolutions of the Planets, and that with as true time and measure as they perform the same above. Of this Sphear *Claudian* hath an Epigram that acquaints us with some thing of the Fabrick of it.

*Jupiter in parvo cùm cerneret  
æthera vitro;*

*Risit, & ad superos talia dicta refert.  
Hæcine mortalis progressa poten-  
tia cura ?*

*Fam meus in Fragili luditur  
orbe labor.*

*Fura Poli, Rerumque fidem, Le-  
gèsq̃ue Deorum,*

*Ecce Syracusius Transtulit  
arte Senex \*.*

*Inclusus variis famulatur Spiri-  
tus astris,*

*Et vivum certis motibus urget  
opus.*

*Percurrit proprium mentitus signifer  
annum,*

sc. Archimedes.

Et



*Et simulata novo Cynthia mense  
redit.*

Translated thus by Mr Nathaniel Car-  
penter in his Geography.

In a small Glass when *Jove* beheld the  
skies,

He smil'd, and thus unto the Gods re-  
plies ;

Could man extend so far his studious  
care,

To mock my labours in a brittle  
sphear ?

Heavens Laws, Mans Ways, and Na-  
tures Sovereign Right

This Sage of *Syracuse* translates to  
fight.

A soul within on various Stars attends,  
And moves the quick Work into cer-  
tain ends ;

A feigned Zodiac runs its proper year,  
And a false *Cynthia* makes new  
months appear.

And now bold Art takes on her to  
command,

And rule the heavenly Stars with  
humane hand.

Who can admire *Salmones* harmless  
Thunder,

When a slight hand stirs Nature up to  
wonder ?

his

This is mentioned also by *Ov. 6. Fast.*

*Arte Syracosia suspensus in aere clauso*

*Stat Globus, immensi parva figura poli.*

From that description of *Claudian*, we  
observe first, That this Machin did move  
of it self, it was an *Automaton*, a self-  
moving device ; and which moved re-  
gularly by certain laws,

*Et vivum certis, motibus urget opus.*

As the Poet saith. 2. We learn from  
him, that these motions were driven and  
acted by certain *Spirits* pent within,

*Inclusus variis famulatur spiritus astris.*

About which spirits *Kircher* hath often  
beaten his brains, what to make of them,  
that he might know what was the inward  
principle of motion in that machin : But  
after all his study and scruting, he could  
never find it out, but he contends that the  
Circles of that Sphear were of brass, and  
the out-side (only) was of glass or specu-  
lar stone, which the Poet might call *vi-  
trum*, glass, for the perspicuity of it.

Yet Authors do make mention of a  
Sphear of glass which *Sapor* King of *Per-  
sia* had, which was so large, that he could  
enter within it, and sit in the midst of it,  
and see the Sphears and Planets whirling  
round about him ; which did swell him

D

with

with such a conceit, that in his Letters he did use this stile, *Rex regum Sapor, Particeps Syderum, Frater Solis & Luna.*

*Paulus Fovius Sabellianus.* We read of a silver Heaven sent by the Emperour *Ferdinand* for a Present to *Soliman* the grand Signior, which was carried by twelve men with a book along with it that shewed the use of it, and how to order and keep it in perpetual motion. *Du Bartas* makes mention of both, and concludes his description of them with this Rapture touching humane wit.

*O compleat Creature! who the starry  
Sphears*

*Canst make to move, who'bove the hea-  
venly Bears*

*Extend'st thy power, who guidest with  
thy hand*

*The days bright Chariot, and the hea-  
venly brand.*

*Kercher* doth highly extol and admire the Artificers of this latter age for making Sphears and Globes, and such representations; who can make them (saith he) with such exactness and perfection in all points, that *Jupiter* might have juster cause to complain of them, then he did of *Archimedes* (in *Claudian*) for their presumptuous emulation of his handy-works.

Among

Among the Moderns, one *Cornelius van Drebbel* a Dutchman of *Alcmar*, may deserve just admiration: This man lived here in *England*, and was *Regi Jacobo à Mechanicis* (as one saith) King *James* his Engineer, he presented the King with a rare Instrument of perpetual motion, without the means of Steel, Springs, or Weights; it was made in the form of a Globe, in the hollow whereof were Wheels of Brass moving about, with two pointers on each side thereof, to proportion and shew forth the times of dayes, moneths, and years, like a perpetual Almanack; it did represent the motions of the heavens, the hours of Rising and Setting of the Sun, with the Signe that the Moon was in every 24 hours, and what degree the Sun was distant from it; how many degrees the Sun and Moon are distant from us day and night, what Signe of the Zodiack the Sun was in every moneth; it had a circumference or ring which being hollow had water in it, representing the Sea, which did rise and fall, as doth the flood, twice in 24 hours, according to the course of the Tides. This *Bezaleel* was sent for to the Emperour of *Germany*, who sent him a chain of gold:

A rude Scheme of this Instrument may be seen upon paper in Mr Tho. Tims Philosophical Dialogue, *Dignus rex Archimede isto altero; Dignus Archimedes Batavus magno illo rege*, as Marcellus Frankheim (another Dutchman) speaks of King James and his Engineer, in his Epistle to Ernestus Burgravius. Of this Microcosme or Representation of the World which we now mentioned, the excellent Grotius hath framed this Epigram following.

*In organum motus perpetui quod  
est penes Maximum Britannia-  
cum Regem Jacobum.  
Perpetui motus indelapsa potestas  
Absq; quiete quies, absq; labore labor,  
Contigerant cælo, tunc cum Natura caducis,  
Et solidis unum noluit esse locum.  
Et geminas partes Luna disspescuit orbe,  
In varias damnans inferiora vices.  
Sed quod nunc Natura suis è legibus exit  
Dans terris semper quod moveatur opus?  
Mira quidem res est sed non nova (maxime  
Regum)  
Hoc fieri docuit mens tua posse prius.  
Mens tua quæ semper tranquilla & torpida  
nunquam,  
Tramite constanti per sua regna meat.*

Ut

*Ut tua mens ergò motûs cælestis Imago:  
Machina sic hæc est mentis Imago tua.*

Translated thus.

The untired strength of never-ceasing motion,

A restless rest a toy-less operation,  
Heaven then had given it, when wise Nature did

H. V.

To frail & solid things one place forbid;  
And parting both, made the Moons Orb  
their bound.

Damning to various change this lower ground.

But now what Nature hath those Laws transgressed,

Giving to earth a work that ne're will rest?

Though 'tis most strange, yet (great King 'tis not new;

This Work was seen and found before in You.

In You, whose minde (though still calm) never sleeps,

But through your Realms one constant motion keeps:

As your minde (then) was Heavens type first, so this

But the taught Anti-type of your mind is.

D 3

One

One *Fanellus Turrianus* a Citizen of *Cremona*, made brazen heavens in imitation of those of *Archimedes*, and far surpassing them for Art, saith *Gaffarellus* in his book of *Curiosities*; and *Ambrose Morinus* in his description of *Spain*. *Erasmus* had a golden Ring given him by one of the Princes of *Germany*, which being explicated, was a perfect celestial sphere, just of that form we call the *Armillary Sphere*, as we read in his life.

*Fanellus* before mentioned did recreate the Emperour *Charls* the first (when he had resigned up his Empire, and retired to a Monastique life in *Spain*) with ingenious and rare devices: Oftentimes when the cloth was taken away after dinner, he brought upon the board little armed Figures of Horse and Foot, some beating Drums, other sounding Trumpets, and others of them charging one another with their Pikes. Sometimes he sent wooden Sparrows into the Emperours Dining room, that would fly round about, and back again; so that the Superiour of the Monastery coming in by accident, suspected him for a Conjuror. He framed a Mill of Iron that turned it self, of such subtile work and smalness, that

a Monk could easily hide it in his sleeve; yet would it daylie grinde so much wheat as would abundantly serve eight persons for their days allowance. This was he who made the Water work, which by a new Miracle of Art, drew up the River *Tagus* to the top of the Mountain of *Toledo*. All this we have from *Famianus Strada's* excellent History of the *Low Country Wars*.

D 4

CAP.

## CAP. III.

'ΑΥΤΟΜΑΤΟ-ΠΟΙΗΤΙΚΗ',

*Of sundry Machins, and Artificial Motions.*

Wisd. 7. 10  
Θεὸς αἰεὶ  
γεωμετρεῖ.  
Plutarch  
Sympof. 1.  
8. 9. 2.  
**G**OD framed the world by Geometry (as we may say) that is, with wonderful Art; he did all things in Number, Weight, and Measure. *Aristotle* calls him *Νεφεωιδέστην τοῦ κόσμου*, The great Engineer of the world, that tacked this rare *Systeme* of heaven and earth together, tackt the Center to the Sphears, and made the whole Frame to move in a wonderful order from its first creation to this day. The earth is a rare piece of his Staticks, being hanged upon nothing, as *Job* saith, *Job* 26. 7. it hangs in the very Center and middle of the world, like a Ball in the Ayr, but fixt and immovable, being evenly ballanced and counterpoized with its own weight: *Ponderibus librata suis*.  
Ou. Met.  
1. 1.

*suis*. So those pendulous Mountains (the Clouds) whose ballancings that great Philosopher *Job* admired, *Job* 37. 16. and those fiery Mountains (the Comets) are Gods *Isorropica*, and some admirable parcels and pieces of his *Mathematiques*. But the whole Machin of the world being taken in the entire frame and fabrick of it, is a greater wonder then all other wonders in the world, as *S<sup>t</sup> Augustine De Civit.* <sup>l. 11.</sup> gives his judgement. This is a kinde of an *Automaton* or Engine that moves of it self, much like a great Clock with wheels and poyzes, and counterpoyzes, that is alwaies in motion, though no body moves it.

For I cannot believe that the Angels (those glorious creatures) are tyed to the heavenly bodies (like dogs in a wheel) to give them motion, but that that great Engineer which made them, gave them a seeing or motion at first, that continues to this day, and will continue so long as the Sun and Moon endureth.

As the great world is an *Automaton*, so is the little world (man) a sort of a self-moving Engine, that performs its several motions by certain Springs, and Wheels, and Chords that are acted by one secret principle

principle of all motions, to wit, the heart and spirits therein contained, and which are from thence dispersed through the whole frame of the work.

*Mens agitat molem, & parvo se corpore miscet.*

Now it is observed, that the wit of man by a diligent and attentive perusal of the world and himself, hath framed sundry useful Machins and artificial motions, after those patterns, after the frame and model of those two primary *Automata* that God himself made. A Mill was first made after the pattern of a man's mouth, as *Seneca* tells us in his ninth Epistle; An Organ pipe had its pattern from mans weazand, which is inspired with the Lungs, and many other Inventions have been hinted unto us from the Organs of mans body, and the actions performed by them.

For Engineers, such as were expert in the practical part of the Mathematiques, these were the most renowned in ancient times. *Archimedes* of Syracuse, *Architas* of Tarentum, *Severinus Boetius* of Rome, *Proclus*, *Heron*, and *Ctesibius*, both of *Alexandria*, of later times, *Regiomontanus*

*tanus* of *Norimberg*, *Simon Stevinus* of lower Germany, *Cornelius van Drebbel* his Countryman, whom we mentioned before, *Athanasius Kircher* by birth a German, but living (of late) in *Rome*, and *Marinus Marfennus*, a Frier of *Paris*. These were *Magi* and *Thaumaturgi Mathematici* wonder-workers, or such as performed marvellous feats by their great skill in Mathematical Sciences.

*Cassiodorus* a grave learned man, and Secretary to *Theodorick* King of the Goths, gives this character of the above-named *Boetius* in a certain Letter written unto him: *You know (saith he) the secrets of Nature, and can work wonders by your Art, Metals do bellow and make a noise: Diomedes cast in brass, sounds his Trumpet louder; Here the brazen serpent hisses, and there artificial Birds (that had no voice) sing melodiously; yet these are but trivial things to relate of him, who can imitate the motions of the heavens here on earth.*

All artificial motions (generally) are performed by Ayr, or by Water, and so all Engins, at least such as move of themselves, are (or may be) divided in *spiritalia & Aquatica*. *Heron* of *Alexandria* writ books *de spiritalibus Machinis*, or wind

wind motions or machins moved with the ayr or wind: and *Paptista Porta* hath some thing *de pneumaticis experimentis*, or wind-motions, in his fifth book of *Natural Magick*, and *Marinus Mersennus* hath written *Phænomena pneumatica*. I will here produce some instances or examples of both kindes, and first of *pneumatic* or wind motions.

*De*  
*Spiritibus Machinis,*  
*Or*  
*WIND-MOTIONS.*

**O**F this kinde (I conceive) was that Wooden Dove of *Architas*, which he made to fly in the Ayr, which was by the means of Ayr pent or inclosed within, which in the motion being something rarified, kept it up aloft, and with some wheels contrived in the concavity thereof, did set it forward; so *Aulus Gellius* gives us some hint of the contrivance of it; *Ita erat libramētis suspensum, & aurâ spiritûs inclusâ, & occulta*  
*Not. Ant. l. 10. c. 12.* *constitum,*

*constitum*, &c. *Julius Scaliger* understood the feat full well (it seems) for he professeth the skill to make the like with a wet finger, as we say. By the same art did *Regiomontanus* make a wooden Eagle <sup>*Exercit. contra Gardan.*</sup> to fly from *Norimberg* to meet the Emperour on his way thither; and when it <sup>326.</sup> met him, it hovered over his head with a Tonick motion, and then returned along with him the same way that it came. The Iron Fly was the like device, made by the same *Regiomontanus*, which springing from under his hand, would fly round about the room with a humming noise, and then return back under his hand again.

*Simon Stevinus* a Dutchman, made a chariot to go with sails, which was as swift almost as the wind that drove it; for it would carry eight or nine persons from *Scheveling* in Holland to *Putten* in two hours, which was the space of forty miles and upwards.

*Monfieur Peyresc*, a learned Antiquary of *France*, made a journey to see it, and was in it, and did use ever after to mention it with wonder, as *Glassendus* tells us in his life: It was made in fashion of a boat with four wheels, two sails, and a stern.

( 30 )

stern. *Grotius* hath excellent Poems in commendation of that Invention, two of the concisest I thought good to insert here,

*In currus veliferos.*

*Ventivolam Typhis deduxit in aquora navem?*

*Jupiter in terras, æthereâmq; domum  
In terrestre solum virtus Stevinia, nam nec  
Typhy tuum fuerit, nec Jovis istud opus.  
Aliud in eisdem.*

*Hactenus immensum Batavi percurrimus  
aquor,*

*Oceani nobis in via nulla via est.*

1. *Mare. Nerea Cattorum soboles consumpsimus omnes*

*Fam nihil est ultra, velificatur humus.*

Translated

*Typhis* to Sea the first Ship brought, and  
*Fove*

To heaven, where *Argo* now a star doth  
move:

But first by Land in Ships *Stevinus*  
went:

For that, nor *Fove*, nor *Typhis* did in-  
vent.

Another

( 31 )

Another.

The vast Sea hitherto the Dutch have  
sailed

Search'd every Coast, found each point,  
and prevailed;

The Ocean's all made pervious by their  
hand,

Now nothing more is left, they sayl by  
land.

We read that in *China* and the Island  
of the *Philippines*, there are the like devi-  
ces, as *Boterus* relates in *Politia Illustri-  
um*; and *Hondius* in his Map of *China*  
hath a type thereof; so that now we sail  
on the land, and on the water, and under  
the water too; and an ingenious Gen-  
tleman of this Nation talks of sayling in  
the Ayr too (in a flying Coach) which he  
conceives to be feasible, and promises  
some attempt that way.

*Cælius Rhodiginus* relates, that the *Æ-*  
*gyptians* had made some Statues of their  
Gods, both to walk of themselves, and  
also to utter some words articulately:  
For their motion, it must be ascribed to  
some wheels and springs within, like the  
contrivances of *Dædalus* his Statues, and  
*Vulcan's* Tripodes: But for their voice  
or speech, it must be ascribed unto some  
Ayr



Ayr forced up through some pipes placed in the heads and mouth of these Statues. So we must conceive of the artificial Lions that roared like the natural ones; and the artificial Birds that imitated the voices and tunes of real Birds, which *Luit-Prandus* saw at *Constantinople* in the Emperours palace, when he was sent thither upon an Embassie from *Berengarius* King of the Lombards, *Anno Dom. 950.* as the said *Luit-Prandus* relates in the sixth book of his History. Such was that Statue of *Albertus magnus* which spake to *Tho. Aquinas*, and that brazen head of *Roger Bacon* a Carmelite Friar of *Oxford*, and perhaps that Image that *Sir Richard Baker* saith was made by Necromancy in the time of *Richard* the second, and not long before the Parliament that wrought Wonders, as Histories speak; which Image uttered at an hour appointed these words, *The head shall be cut off, the head shall be lift aloft. the feet shall be lift up above the head:* *Sir Richard Baker* in the life of *Rich. 2.*

*Gornelius van Drebbel* that rare Artist we spake of) made a kinde of an Organ that would make excellent Symphony of its self, being placed in the open Ayr and clear

clear Sun, without any fingering of an Organist; which was (as we conceive) by the means of Ayr inclosed, and the strictures of the beams rarifying the same; for in a shady place it would yeild no Musick but where the Sun-beams could play upon it, as we read of *Memnons* Statue that would make some kinde of Harmony when the Sun did beat upon it; whereof we speak more hereafter.

At *Dantzick* a City of *Prussia*, *M<sup>r</sup> Morison*, an ingenious traveller of this Nation, saw a Mill which (without help of hands) did Sawe boards, having an iron wheel, which did not only drive the sawe, but also did hook in, and turn the boards unto the Sawe. *D<sup>r</sup> John Dee* makes mention of the like which he had seen at *Prague* in his preface to *Euclide*; but whether the Mill moved by wind or water, they do not mention: We heard of the like device set up in *Kent* here in *England*, and some other places.

*Archimedes* his Sphear was some pneumatical Engine, that moved of it self by means of some inclosed Spirits, as appears by that Verse of *Claudian* in the description of it.

*Inclusus variis famulatur spiritus Astris.*

E

There

There are certain *Æolii Sclopi*, or wind-muskets that some have devised to shoot bullets withal, without powder, or any thing else, but wind comprést into the bore thereof, or injected with a spring (as boys use to shoot pellets with Elder-guns, by breathing air into them) which will shoot with as great force as powder.

*Æolia pile* (which by contraction they call *Æolipiles*) are also of this kinde, which are little things made of brass or copper in the form of a ball, or pear, or bellows (but concave) with a little small hole; these being filled with water (which they do by heating them in the fire, then throwing them into water) and then being set near the fire, the water rarifies into air, the air being scantied of room bursts out with great violence, and for a long season. They are used by *Chymists* to blow their coals with, as I have heard, and by some others to excite heat for melting of glass and mettals, and are called by some *the Philosophical bellows*.

A spit may be turned as *Cardan* shews, without the help of weights or hands, by the motion of ayr rarified by the fire, and ascending up the chimney, only a pair of sails must be placed in that part of the chimney

Baptista  
Portal. 8.  
Mag. Nat.

chimney where it begins to be narrow, and a wheel below, to the Axis whereof the spit-line must be tyed; the ayr so ascending will turn the wheel, and the wheel the spit, as long as there is any fire in the chimney.

---

De  
*AQUATICIS MACHINIS,*  
Of  
*WATER MOTIONS.*

Our ordinary Water mills that move by the force of water, are an excellent invention, if we consider the various implements that belong unto them, and with how little labour they are kept up to perform their work, when they are once set in order.

I will shew you (saith *Rodulph Prince of Camerino* to the Duke of *Anjou*) two stones that do excel all in your Cabinet, and shewed him two Millstones. These cost but ten florins, said he, and they bring two hundred florins yearly. But the Mill

*Itiner.*  
*Gallo Belg* called the *Basacle* at *Thelous* in *France*, is a Machin of more then common art, as *Abraham Gelnitz* (that saw it) tells us; It is a thing worth your seeing (saith he) for there is not such another in all *France*: So is that at *Dantzick* in *Prussia*, which hath eighteen rooms, and brings a gold gulden of profit every hour to the publique Treasury, saith *Mr Morison* in his Travels.

At the Mint of *Segovia* in *Spain*, there is an Engine that moves by water so artificially made, that one part of it distendeth an Ingot of gold into that bredth and thickness as is requisite to make coyn of; it delivereth the plate that it hath wrought unto another that printeth the figure of the coyn upon it, and from thence it is turned over to another that cutteth it (according to the print) in due shape and weight; and lastly, the several pieces fall into a reserve in another room, where the Officer (whose charge it is) findeth treasure ready coyned, as a noble and learned Gentleman of this Nation in his Treatise of *Bodies* relates.

*Sir K. D.*

The Italians make rare devices by the motions of water; In the Duke of *Florence* his garden at *Pratolino*, is the picture  
of

of *Pan* sitting on a stool with a wreathed pipe in his hand, and *Syrinx* beckning unto him to play on his pipe: *Pan* putting away his stool and standing up, plays on his pipe; this done, he looks on his *Mistris*, as if he expected thanks from her, takes his stool again, and sits down with a sad countenance.

There is also the Statue of a Landress beating a buck, and turning the clothes up and down with her hand, and the battledor wherewith she beats them in the water. There is the Statue of *Fame*, loudly sounding her Trumpet; The picture of a Toad creeping to and fro, and a Dragon bowing down to drink water, and then vomiting it up, with divers other knacks of wonder and delight, as *Mr Morison* relates.

At *Tybur* or *Tivoli* near *Rome*, in the Gardens of *Hyppolitus d'Este* Cardinal of *Ferrara*, there are the pictures of sundry Birds on the tops of Trees, which by Hydraulic art and secret conveyances of water through the trunks and branches of the Trees, are made to sing and clap their wings, but at the picture of an Owl appearing suddenly out of a Bush, they are all mute and silent, as *Schottus* in his

Itinerary of *Italy*. It was the work of *Claudius Gilius*, as *Possevin* informs in l. 15. of his *Biblioth. select. c. 1.*

There are in sundry places of *Italy* and elsewhere, certain *Organa Hydraulica*, that is, Organs that make good Musick of themselves, only by forcing the water up the pipes, and by the collision of the Ayr and Water therein: The lower part of the pipes are placed in the water (as *Petrus Victorius* describes them) which water being forced up with a scrue, or such device, doth inspire the pipes, as well as the wind that is made with a bellows. Among the water-works in the Duke of *Florence* his garden, there was an Hydraulic Organ that with the turning of a cock would make sweet harmony, as Mr *Morison* relates; the invention is ancient, for *Ammianus Marcellinus* makes mention of one l. 14. and *Claudian* describes one thus in his Poem *de consulatu Mallii Theodori*.

*Et qui magna levi detrudit murmura tactu  
Innumeras voces segetis moderatus Aëne  
Intonat erranti digito, penitusq; irabali  
Veste, laborantes in carmina concitat undas.*

Which

Which invention is by some ascribed to *Ctesibius*, an ingenious Artist of *Alexandria*, by others to *Archimedes* of *Syracuse*, as *Tertullian* writes, of which he speaks thus, *Spesta potentissimam Archimedis munificentiam (scilicet) Organum Hydraulicum, tot membra, tot compagines, tot partes, tot itinera vecum, tot compendia sonorum, tot commercia Nodorum, tot acies tiliarum, & una moles erant.*

In those Roman spectacles or publick shews exhibited by the Roman Emperours, we read of divers rare devices, and artificial motions, some whereof may not improperly be inserted in this place.

There were Amphitheaters both at *Rome* and *Verona*, and elsewhere, which were prodigious piles, both for magnificence of cost, and inventions of Art; whole groves of great Trees (with green branches) were brought and planted upon the sandy Theater, and therein a thousand Estridges, a thousand wilde Boars, and a thousand Stags put in for the people to hunt. This Forrest being removed, they would on a sudden overflow all with a deep Sea, fraught with Sea monsters, and strange Fishes; then might you see a Fleet of tall Ships ready rigged and

*Infana  
Moles.*

E 4

appointed

appointed, to represent a Sea-fight: then all the water was let out again, and Gladiators or Fencers fight, where the Gallies stood but even now; which things are expressed in verse by *Juvenal* in his third *Satyr* thus:

——— *Quoties nos descenditis Arena  
Vidimus in partes, ruptâq; voragine terra  
Emersisse feras & iisdem saepe latebris  
Aurea cum Croceo creverunt Arbusta libro:  
Nec solum nobis Sylvestria cernere monstra  
Contigit, Aequoreos ego cum certantibus  
Ursis  
Spectavi vitulos & equorum nomine dignū  
Sed deforme pecus*———

Translated by *H. V.*

How oft have we beheld wilde Beasts  
appear  
From broken gulfs of earth, upon some  
part  
Of sand that did not sink? How often  
there  
And thence did golden boughs ore saf-  
fron'd start?  
Nor only saw we monsters of the wood,  
But I have seen Sea-Calyes whom Bears  
withstood;

And

And such a kinde of Beast as might be  
named  
A horse, but in most foul proportion  
framed.

Sometimes they caused a steep mountain to rise in the midst of the Amphitheater, covered with fruitful Trees, with streams and fountains of water gushing out: sometimes a tall Ship would float up and down of its self, which splitting asunder, would disgorge five or six hundred beasts to be baited, then vanish away: sometimes odoriferous waters would spout out to bedew the people, and refresh them with the scent; sometimes they would represent the Fable of *Orpheus*, and then the Trees must move up and down, as the Poets fame they did when *Orpheus* played on his Harp.

*Repperunt scopuli, mirandaq; sylva cucurrit* Mart. Epig. 23.  
*Quale fuisse nemus creditur Hesperidum*  
*Affuit immixtum pecudum genus omne*  
*ferarum*  
*Et supra vatem multa pependit avis.*

The Rocks did creep, vast Woods did  
strangely move,

Such

Such ('tis believ'd) was the *Hesperian*  
 Grove;  
 Wilde Beasts and tame profusely came  
 to fight,  
 And ore the Poets head, birds did alight:

So *Martial* speaks of this representation  
 by *Domitian* the Emperour, wherein  
 those things were really performed on  
 the Theater, which the Poets had but  
 fabled, as he saith,

*Quicquid fama canit donat arena tibi.*

Which motions were performed *per*  
*Machinamenta Neveardiana*, as Mr *Farnaby*  
 conjectures in his Annotations, or by  
 men placed in the hollows of the Trees  
 and Rocks; but in this creeping Forrest  
 there were beasts of all kinds among the  
 trees, and birds on the tops of them, all  
 attentively listning to the ravishing har-  
 mony that was made by some Musician  
 that did personate the Thracian Lutinist.

Epist. 90.

In Rome there were *versatilia Cœnatio-*  
*num Laquearia*, as *Seneca* tells us, that is,  
 certain dining chambers made with that  
 art, as if they were moveable Scenes;  
 for whilst the guests sate at Supper, they  
 should be turned about to several rooms  
 adorned with differing furnitures; at eve-  
 ry

ry new course of meat, they should be  
 transported into a new chamber, they sit-  
 ting still all the while in their seats, *Sen.*  
*Ep. 20.*

That *Plicatilis domus*, that portable  
 Palace made of Wood by *Henry* the 8<sup>th</sup>,  
 and carried over to *France* to that fa-  
 mous interview that he had with *Francis*  
 the first, was a work of great magnifi-  
 cence and art, and much spoken of by  
 forraign Writers, especially *Paulus Jo-*  
*vinus*; and among our own, by my Lord  
 of *Cherbury* in his History of that Prince,  
 the model whereof was preserved, and  
 was to be seen of late years (as he saith)  
 in the Tower of *London*.

### Of MEMNONS Statue.

MEMNON was a King of Egypt  
 and in memory of him, there was  
 a *Colossus* or mighty statue made of black  
 marble\*, and set up in that magnificent  
 Temple of *Serapis* in Thebes. Called  
Basaltus.

It was made by the Theban Priests  
 with such art and contrivance, that in the  
 morning upon the striking of the beams  
 of

of the Sun upon it, it made a kinde of Musick; it was so famous a piece, that men travelled from far to see it. *Lucian* the Sophister went to see that Miracle, as he calls it, as he relates in his *Philopseudes*; so did the Emperour *Severus*, as *Spartianus* tells us, and *Germanicus*, as *Tacitus*; and *Strabo* that judicious Geographer went to see it, and heard the Musick, and a great multitude of people at the same time with him; so did *Apollonius* of *Tyana*, as *Philostratus* relates.

This Colossus upon a certain earthquake that hapned, was broken in the middle, and yet it was as Musical as when it was whole, as *Strabo* affirms in the 10<sup>th</sup> of his *Geography*, and *Juvenal Sat.* 15: avers the same,

*Dimidio Magica resonant ubi Memnone  
chorde.*

This matter need not seem fabulous or incredible (nor will not saith *Natalis Gomes*) to any that understand the power of Art and humane Wit, and how expert the Theban Priests were in Astronomy, and all other Philosophical Sciences, see *Pliny* hereof, l. 35. c. 7.

*Ath. Kircher* in his *Oedipus*, conceives it

it was a *Telesme*, or made by *Talismanic* \* Who list to know more of *Telesmes* and *Talismanic* Art, may read *Marfil. Ficinus de vitâ cœlitum comparanda* l. 3. c. 18. *Joseph Scaliger* l. 3. *Epistola* 226. 2. and learned *M. Gregory* his *Opuscula*, cap. 8.

But yet he shews, that such a Musical statue may be made by Mathematical and natural contrivance upon the ground of rarefaction: *magnam enim vim in natura rerum, rarefactionem obtinere, nemo ignorat*, saith he, *Tom. 2. Oed. Egypt.* where you may finde more examples of pneumatical devices among the Ægyptians in their Temples.

C A P.

## CAP. IV.

## ΓΡΑΜΜΑΤΙΣΤΙΚΗ:

O R,

*The Art and Mystery of Writing, with the Instruments thereunto belonging.*

**A**Mong all the Inventions and productions of humane Wit, there is none more admirable and more useful then Writing, by means whereof a man may copy out & delineate his very thoughts and minde, and make that visible which none can see but he that made it; whereby a man can utter his minde without opening his mouth, and signifie his pleasure at a thousand miles distance, and this by the help of four and twenty letters, and fewer in some places; by various joyning and combining of which letters, as also by the transposing and moving of them

them to and fro, all words that are utterable or imaginable may be framed; for the several combinations of these Letters and different ways of joyning them, do amount (as *Clavius* the Jesuite hath taken the pains to compute and observe) to 5852616738497664000 ways; so that all things that are in heaven or in earth, that are, or were, or shall be, that can be either uttered or imagined, may be expressed and signified by the help of this marvellous Alphabet, which may be described within the compass of a farthing.

*In sphaera  
Joh. de  
Sacro  
bosco c. 1.*

The *Chinois* have 40000 letters at least, as *Purchas* and others tell us, which makes the language so difficult, that a man cannot learn it in an age, which renders our Alphabet of 24 letters the more admirable.

Though the vulgarity and commonness of this art hath made it less esteemed and set by, yet wise and considerate men that look upon things *eruditis oculis* (as *Cicero* speaks) do much admire the Invention.

The Hebrews call it *Dick-Duk*, *inventum subtile*, a subtile and ingenious Invention: *Greg. Theolosanus*, *Divinum Miraculum*, l. 16. de *Rep. c. 2.* a Divine miracle;



miracle; Cicero speaks of it with admiration, *Quis sonos vocis, qui infiniti videbantur paucis litterarum notis terminavit?* l. 1. Tuscul. The Indians admired it not a little, when they saw the Spaniards send Letters to and fro, and maintain a kinde of a dumbe Commerce among themselves by this way; they fancied that these Letters were some Spirits that were the *Internuncii* or Interpreters between them.

Purchas l.  
8. of America.

Tbo. Reading  
inventa  
Adespota

*Quisquis erat meruit sentit transcendere metas*

*Et fati nescire modum, qui mystica primus*

*Sensa animi docuit magicis signare figuris. &c.*

So a modern Poet sings in commendation of it.

For the first Invention of Letters, the Phœnicians carry most voices.

*Phœnices primi (Fama si credimus) ausi  
Mansuram rudibus vocem signare figuris.*

Phœnicians, that (if Fame we dare believe)

To Humane Speech first Characters did give.

Among

Among the Phœnicians *Cadmus* had the honour of this Invention; whence one calls letters *Φολινιασθησά τε Κάδμου*; and another, *ingellas Cadmi filias*, the black and swarthy daughters of *Cadmus*: But the truth is, they did but borrow them from the Hebrews, as all other Nations did; though perhaps by adding some few, or varying and altering their form and character, they seem now to have different Alphabets, *Herm. Hugo.*

Auson.  
Epigr.

The Librarians of old, who lived by writing books which others had made, were very admirable in handling the pen as appears by ancient manuscripts, which are so neatly and artificially done as if they were printed. Some of the latter age have been excellent in this Mystery. One *Francis Alumnus* did write the Apostles Creed and the first fourteen verses of St *John's* Gospel, in the compass of a penny, and in full words, which he did in the presence of the Emperour *Charles* the 5<sup>th</sup>, and Pope *Clement* the 7<sup>th</sup>, as *Genebard* relates in his Chronologie, and *Sim. Maiolus* out of him, who had also in his own possession such a miracle (as he calls it) or the very same I believe, *Nos domi idem miraculum servamus*, these are his

his words in his 23<sup>d</sup> Colloquy. *Pliny* hath a parallel example of one (whom he doth not name) that wrote all the *Iliad* of *Homer* in a piece of Parchment that was so little, that it was contained in a Nutshell. *Cicero* and others mention the same, though *Lancelotti* puts it among his *Farfaloni*, and reckons it for one of the popular errors of *Pliny*.

I read of one *Thomas Sweicker*, a Dutchman, who being born without hands and arms, could write with his feet, and that elegantly; he could also make his pen with his feet, and many other feats, which I finde expressed in these verses.

*Mira fides ! pedibus dextre facit omnia*  
Thomas

*Cui natura Parens brachia nulla*  
*dedit.*

*Namq; bibis pedibus, pedibus sua Fercula*  
*sumis*

*Voluit & his libros preparat his cala-*  
*mos.*

*Quin & litterulas pede tam benè pingere*  
*novit*

*Artificis superet grammata Dueta*  
*manu.*

*Maximus*

*Maximus hoc Cæsar stupuit quondam* *Maximili-*  
*Æmilianus \** *an the Em-*

*Donaq; scribenti largus honesta dedit.* *perour.*

The Duke of *Saxony* doth keep some Copies of his Writing among his *κειμήλια*, or Rarities, as *Fel. Platerus* relates in his observations. There was a woman in this Kingdom of late years that could write with her feet, and do many other things to the wonder of the beholders, and went about the Kingdom.

Besides the common way of Writing, there are some mysteries and secret ways, and that either by abbreviation, setting a letter for a word, and a word for a sentence for brevity sake, as the Hebrews and Romans anciently used to do; or else by using different characters from the common and vulgar ones, such as none can read or understand but the author or deviser of them, and such as he is pleased to impart the mysterie to, and give him a key to decipher and open the secret by; which sort of characters the Ancients used to call *Furtivas notas*, and *Sifras*, and *Ziglas*, and the Art it self *Ziglography* and *Brachygraphy*, it is very useful for two respects,

F 2

1. For

1. For haste and brevity.

2. For privacy and secrecy.

1. For brevity and expedition; it is a good way to take a speech or a sermon, or any thing else that is dictated, as fast as it is spoken; hereby the Notaries hand will keep pace with the speakers tongue, and out-strip it too;

Mar. l. 14. *Currant verbaliset, tamen est velocior illis,  
Nondum lingua suum, dextra peregit opus.*

l. 5. This is *scribere* διὰ σημείων, as Cicero Ep. 13. l. 5. ad Atticum. Dion ascribes the invention to Mænas,

Πρῶτος σημεῖα γραμμάτων τίνα πρὸς ταχὺς ἔθηκε. He first found (saith he) the Abbreviations and compendious way of Writing for expeditions sake.

Manil. l. 4. Astron. *Hic erit & fœlix scriptor, cui litterum verbum est,*

*Quicq̃ notis linguam superet, cursumq̃ liquentis,*

*Excipiat, longas nova per compendia voces.*

2. This *Ziglography* is useful for secrecy or privacy *ad elusionem examinis*; for hereby a man may carry a letter open in his hand, and understand never a word of

of it; and they that make no Religion of opening letters, finde themselves deluded; which is of good use in time of war, and at other times against paper-pyrats that lie in wait for such poor booties; *Quod ad te de decem legatis scripsi, parum intellexi credo, quia diu Cnætor scripseram*, saith Cicero to his friend Atticus, who did not understand all the letter that Cicero had written unto him, because he had written part of it in characters.

*Julius Cæsar* had found out such a device for secrecy, *sic structo litterarum ordine ut nullum verbum effici posset*, he did so tumble, invert, and transpose the Alphabet in his writing, that no man could pick any sense out of it; and this he devised when he began to think of the Roman Monarchy, and was by him used but to private and tryed friends that were his confederates, and privie to his Designe.

*An Appendix of the Instruments of Writing.*

**T**HE Instruments of Writing are either 1. *Active*, or 2. *Passive*. That is, either the Instruments wherein we write, or wherewith we write.

The instruments wherein we write are divers; as Stone, Brass, Wax, Lead, Barks and Leaves of Trees, Paper and Parchment.

The first Writing that we read of was in *stone*, God did write the Law in two Tables of *Stone*, *Exod.* 19. which *Salvian* calls *Rupices paginas*. *Moses* wrote in *Saphyr* and *Onix*, *Exod.* 28. 10. *Saxo Grammaticus* speaks, that the Danes did record the noble Acts of their Ancestors in verse, which were cut in stone, *in saxis ac rupibus* (as he saith) *voluminum loco, vastas moles amplectebantur, codicum usum à cautibus mutuantes. Apud Seldenum.*

The Sybils books were written in the leaves of Trees; the Indians of the west do write in the leaves of the Plane tree, which are as broad as any sheet of paper,

and

and four times as long, saith *Fos. Acoſta* l. 4. cap. 21. So in *Malabar*, and other parts of the *Levant*, they write in the leaves of the *Palm*, as the *Syracusians* did in an *Olive leaf*; from which manner of Writing the pages of books are termed to this day *folios* or leaves.

The ancients used also to write in sheets of lead; this is intimated by *Job*, *O that my words were graven with an Iron pen, and lead in the rock for ever, Job* 19. 23.

The Poems of *Hesiod* call'd *ἔργα καὶ ἡμέραι* were found in *Bæotia* written in plates of lead, saith *Pausanias* in *Bæoticis*. There was a common manner of writing also in thin rindes of trees growing under the upper bark, which is called by the Latines *Liber*, or *Caudex* & *Codex*.

*Udoq, docent inolescere libro,*  
*Virg. Georg.* l. 2.

Whence books are called *Libri* and *Codices*; for *liber* properly is *interior tunica corticis quæ ligno coheret in quâ antiqui scribebant*, as *Isidor* defines it. The Indians of the East used such a kinde of writing, as *Q. Curtius* mentions l. 8 *libri Arborum teneri, haud secus quàm Cera, litterarum notas capiunt*: They wrote also in the leavs of certain reeds, which *Isaiah*

F 4

called

*Marmora*  
*Arundell.*  
*Foliiſque*  
*arborum &*  
*arundinis*  
*mandat.*  
*Virg.* 3.  
*Arund.*

called *papyr-reeds*, *Isa. 19. 7.* growing in the marishes of *Egypt*, which reed or sedge is called *Biblus* or *Byblos*, so *Lucan*,  
*Nondum flumineas Memphis contexere biblos*

*Noverat* — Which the Translator doth english *papyr*.

The *River* yet had not with *papyr* serv'd  
*Ægypt*. *The. May.*

From which term or name of *Biblos*, books are by the Grecians called *Bibloi* and *biblia* dimunitively; and that book of books the Bible; because books were usually made of this kinde of reed or sedge; and the manner was thus; they divided these leaves into thin flakes called *Phyllis*, into which they naturally divide themselves, then laying them on a smooth table, and moistning them with the water of *Nilus* (which is of a glutinous nature) they placed one cross under the other, like a woof and warp in a weavers loom, & then having pressed them, they set them to dry in the Sun, as *Pliny* relates in *l. 13.* of his *Natural History*.

The Roman Laws called the Laws of the 12 Tables, were written in leaves, or tables of brass.

Smal boards or tables of wood waxed over,

were in frequent use among the later Romans to write in, which were called *Cerei pugillares* in sundry Authors, and *Cerata tabula* or *tabellæ*, whence Letter-carriers were called *Tabellarii*. These were the Writing tables that *Zacharias* called for *Luke 1. 36.* Write these things upon a table: *Isa. 30. 8.* *ἐν πύλλῃς* *Septuagint*, box tables. These boards were sometimes made of Box and Cedar-wood, whence that of the Poet *Persius*,

————— *Cedro digna locutus* :

He spake things worthy to be written in Cedar, and worthy of immortality. *Eumenes* King of *Pergamus* devised a way to dress the skins of beasts, and to make them fit for writing, as Vellam & Parchment. This latter is called *Pergamum*, from the Town of *Pergamus*, where it was first made. But the modern invention of paper surpasseth all in this kinde. My Lord *Bacon* reckons it *inter monodica artis* among the singularities of Art, as being a singular and excellent invention; *adeo ut inter materias artificiales vix inveniat* *ur simile aliquid*, saith he, it is a web or piece of cloth that is made without a Loom, & without spinning or weaving. as a modern Poet is pleased to describe it,  
*Denique*

*Deniq; compacta est nullo subtemine tela,  
Exuperans candore nives, Aetate  
metella, &c.*

It derives its pedigree from the dung-  
hill, being made of rags, and things cast  
out of doors as useless; we do not go to  
the expence of making it of Cotton-  
wool, as the Mexicans do, but of nasty  
clouts; *Magnarum usque adeo sordent pri-  
mordia rerum;* of so mean a birth and  
original is this commodity, *Quâ huma-  
nitas vita & memoria maxime constat,  
imo quâ hominum immortalitas,* as *Plin.  
lib. 13. cap. 11.* which *Grotius* describes  
thus:

*Nunc aurata comas, & sicco pumice  
levis*

*Charta, senis scabri fascia nuper  
eram.*

In some parts of the East they make  
paper of silk, as was to be seen in *Ferdi-  
nand Imperatus* his Cabinet of Rarities.

Now speak we of the active instru-  
ments, or those wherewith we write:  
The two Tables of the Law were writ-  
ten with a miraculous pen, to wit, Gods  
own finger: for writing in brass or lead  
they had certain Graving tools that were  
hollow, called by the Latines *calum* and  
*celtes*,

*celtes*, from the hollowness thereof, In *κοιλός*  
waxen tables they wrote with pointed *Calum*  
bodkins of iron, steel, or brass called *sty-  
lus*; this was sharp at one end for to make  
impression in that wax; but it was flat  
and broad, and somewhat hooked at the  
other end, for to scrape or blot out the  
letter if need were. Men write in glass  
with pointed Diamonds, which yeild to  
be cut by nothing else, except the *Smiris*  
or *Emeril*.

In ancient paper made of seggs, they  
wrote with a reed called *calamus scripto-  
rius & arundo*, which kinde of reed grew  
much about *Memphis* and *Cnidos*, and the  
banks of *Nile*.

*Dat Chartis habiles calamos Memphitica* *Mart. L. 14.*  
*tellus,* *Epigr. 38.*

In parchment and the modern paper,  
they write with a pen or quill pluckt from  
the wing of some Fowl, called by *Auso-  
nius Fissipes*, from the slit that is made in  
it for to let down Ink, which is a very  
useful invention, and commended by an  
ingenious Muse of the Low Countries.

*Præteritos reddit, præsentis prorogat* *Barlæus de*  
*annos,* *Penna.*

*Invidiamq;*

*Invidiamq; feri temporis una domat:  
Absenti loquitur, laedit rostrata juvatq;  
Dumq; aliis vitā fœnerat, ipsa caret.*

Past years it rescues, makes the present  
spread

To ages, and times envy striketh dead,  
Instructs the absent, hurts and helps at  
need,

And wanting life, makes others live  
indeed.

*Opmerius* makes mention of the three  
last in his Chronicle, *In pugillares scri-  
bebant stylis ferreis, in papyros autem arun-  
dineis calamis & postmodum etiam avium  
pennis*; so he. Some write with coals,  
but the verse tells you who they are,

*Stultorum calami carbones, mœnia chartæ.*

The Cutlers of *Damascus* write in iron  
steel, and brass, with corroding waters  
only, wherewith they make frets of cu-  
rious figures and characters in sundry  
colours; as may be seen on Turkish Sci-  
miters, and those *Gladii Damascinati*,  
Swords made at that City of *Damascus*,  
beautified with Damask work and Em-  
broidery.

broidery. It lasts long, for with one pen  
did Dr *Holland* a Physitian of *Coventry*,  
a learned and industrious man, write out  
that great Volume of *Pliny*, translated  
into English by himself, which (for a me-  
morial) a Lady preserved, and bestowed  
a silver case upon it. The Queen of *Hun-  
gary* in the year 1540 had a silver pen be-  
stowed upon her, which had this Inscri-  
ption on it,

*Publii Ovidii Calamus.*

Found under the ruins of some Monu-  
ment in that Country, as Mr *Sands* in the  
life of *Ovid* (prefixt to his *Metamorphosis*)  
relates.

---

CAP.

C A P. V.

## ΤΥΠΟΓΡΑΦΙΚΗ :

O F

*Printing, and Printing-  
Presses.**De invent.  
typogr.*

**T**His is a divine benefit afforded to mankind, saith *Polydor Virgil*; an Art that is second or inferiour to none, (saith *Cardan*) either for wit or usefulness: it puts down hand-writing for neatness and expedition; for by this, more work is dispatched in one day, then many *Librarians* or book-writers could do in a year.

— *Quam nulla satis mirabitur ætas  
Ars Cælo delapsa viris; consumere nata  
Materiam, veloxque omnes transcribere  
libros,  
Cum positis, quadrata acie (miro ordine)  
signis.*

This

This Art by multiplying books, hath multiplied knowledge, and hath brought to our cognizance both persons and actions remote from us, and long before our time, which otherwise had perished in oblivion, and never come to our ears.

To whom we owe this Invention, we do not certainly know, it is one of the *Inventa Adestota*, of the masterless Inventions.

*Laus veterum est meruisse omnis præconia fama,*

*Et prævisse simul* —

Ancient Worthies were more studious of doing good then ambitious of Fame or praise for so doing. That it is a Dutch invention is agreed upon by most voices.

*O Germanica muneris reperitrix*

*Quo nihil utilius dedit vetustas,*

*Libros scribere quæ doces premendo.*

But whether *higher* or *lower* Germany shall have the honour of it, is yet in strife and undecided; and in the upper Germany, whether *Mentz*, or *Basil*, or *Straßburg*; for all these do challenge it, and do no less contend for the birth place of this mystery, then the Grecians Cities did for the Cradle of *Homer*. The general voice is for *Mentz*, and one *John Guttemberg* or

*Readi in-  
venta ad-  
spota.*



*Fust* (as others term him) a Knight and Citizen of that City to have been the true Father or Inventor of this Art, about the year 1440. as we have heard it boldly affirmed by the Citizens of that City, saith *Polydor, l. 2. de Invent. rerum. c. 7.* for a testimony hercof they produce a copie of *Tully's Offices* printed in parchment, and preserved in the Library of *Ausburg*, bearing this memorandum at the latter end of it, *Præsens M. Tullii opus clarissimum Jo. Fust Moguntinus Civis, non Atramento plumali Cannâ, neq; arcâ, sed arte quâdam per pulchrâ manu Petri Gerskeim pueri mei fœliciter effeci, finitum Anno 1440. die 4<sup>o</sup> mense Feb.* This is cited by *Salmuth* in his Annotations on *Pancirollus*, who stands stiffly for Germany (his own Country) in this point, and cites another argument from the Library of *Francfort*, wherein an old copie of the decisions of the *Rota* are kept; at the latter end thereof it is said, that it was printed in *Civitate Moguntia, artis impressoriae inventrice & elixatrice primâ.*

But *Hadrianus Junius* a very learned man of the Low Countries, is as stiff on the other side for *Haerlem*, and thinks to carry it clearly from the High Dutch, and

and make the Town of *Haerlem* the birth place of this Noble Art: You may see what esteem men do make of it, when they do so zealously strive and contend for the original Invention of it. his *Junius* tells us (in his History of the Netherlands) that one *Laurence John*, a Burger of good Note and Quality of *Haerlem*, was the first Inventaer of it, and saith that he made Letters first of the barks of Trees, which being set and ranked in order, and clapt with their heels upward upon paper, he made the first essay and experiment of this Art: At first he made but a line or two, then whole pages, and then books, but printed on one side only. Which rudiments of the Art *Junius* saw in that Town.

After this the said *Lawrence* made Types or characters of Tin, and brought the Art to further perfection daylie: but one *John Faustus* (*infaustus* to him) whom he had employed for a Compositor, and who had now learn'd the mystery, stole away by night all the Letters and other Utensils belonging to the Trade, and went away with them to *Amsterdam* first, thence to *Collen*, and lastly to *Meniz*, where he set up for him-

self, and the first fruit and specimen of his Press there, was the *Doctrinal* of one *Alexander Gallus*, which he printed *Anno Dom. 1440*. Thus far *Junius* from the relations of sundry grave ancient Burgo-masters of *Haerlem*. *Hegenitz* a Traveller saith, that the house of *Lawrence Fohn* is yet standing in the Market place of *Haerlem*, with this Inscription in golden Letters over the door,

Memoriæ sacrum.

*Typographiæ Ars Artium Conservatrix,  
hic primum inventa, circa An. 1440.*

*Vana quid Architypos & Præla (Moguntia) jactas?*

*Harlemi Archetypus prælaq; nota scias.  
Extulit hic monstrante Deo Laurentius  
Artem*

*Disimulare virum hunc, disimulare  
Deum est.*

So *Petrus Scriverius*, who calls it *palladium præsidium & tutelam Musarum, & omnis Doctrinæ*. *Joseph Scaliger* contends that the first Printing was upon wooden Tables, the Letters being cut or carved in

in them, and he saith, that he had seen *Horologium Beatae Mariae* (to wit) our Ladies hours done upon Parchment after such a manner, in his answer against *Shcioppus*, called *Confutatio Fabulae Burdumanae*. Yet let not the Germans or any others be too proud of this Invention, for the *Chinois* had such an art long before the *Europeans* saw or heard any thing of it, as it is affirmed by *Parus Maffens*, and sundry others of his fellow-Jesuites that have travelled that Country. One *Nicol. Trigault* that had been of late years in that Country affirms, that that Nation had this art above 500 years since. But their Printing and ours do very much differ from one another, for they do not print by composing of Letters, but as we use for Maps and such pieces, they make for every leaf a board or table with characters on both sides, which is more laborious, and less neat than the European way, as *Gonsalvo Mendoza* a Spanish Frier and others do affirm of it. Now if our Printing surpasses for neatness and expedition, and is so far different from that of the *Chinois* as is before alledged, it is a signe that the Germans did not borrow from them this art; so that the praise and

commendation of this Invention remains to them whole and entire without diminution.

Mrs *Jean Elizabeth Weston*, one of the Muses of *England*, hath composed a Latine Poem (among sundry others of her compositions) in the praise of this art, which is indeed the preserver of all other arts.

---

AS Printing it self is praise worthy, so some Print-houses deserve here to be remembered, especially that of *Christopher Plantin* at *Antwerp*, which a Traveller doth not stick to call *Octavum orbis miraculum*, the eighth wonder of the world. He describes it thus. Over the Gate is *Plantine's* own Statue, made of Freeze-stone, and of *Moret* his Son in Law, and Successor in the Office, and also of *Justus Lipsius* with his Motto,  
 ——— *Moribus Antiquis*.

Here are twelve Presses, and near upon an hundred sorts of Characters : two sorts of Syriac, ten of Hebrew, nine of Greek, forty seven of Latine, and the rest of several other Languages, with Musical characters of sundry sorts, and admirable

admirable brasse cuts for Frontispieces of books. Here that excellent work called the King of *Spain's* Bible was done.

The first Printing Press in *England* was set up in *Westminster* Abby by *Simon Islip* Anno 1471. and *William Caxton* was the first that practised it there, as *Stowe* in his *Survey of London* affirms.

---

CAP.

## CAP. VI.

## ΓΡΑΦΙΚΗ :

O R,

*The Art of Limning and  
Painting.*

Of Archi-  
tecture.  
*Elinguis  
umbrarum  
& lumi-  
num elo-  
quentia ;  
muta line-  
arum po-  
esis.*

**P**Ainting comes near an *Artificial Mi-  
racle*, saith Sir Henry Wotton, to  
make divers distinct eminences appear  
upon a Flat by force of shaddows, and  
yet the shaddows themselves not to ap-  
pear, is the uttermost value and ver-  
tue of a Painter, saith that Learned  
Knight.

———*miror*

*Prælia rubricâ picta aut Carbone  
velut si*

*Re verâ pugnent, feriant, vitentq;  
moventes*

*Arma viri*———

This is a lawfull *dissembling* or coun-  
terfeiting of natural things; it is a witty  
and

and subtile Art, it gives life (in a manner)  
to the dead; by this wee see those that  
have lived many ages before us in their  
true and proper colours, and reade not  
onely the shape and stature of their Bo-  
dies but their Attire, Habiliments and  
Fashions, which no relation of History  
can so well represent unto us or inform  
us of. By this wee see our absent  
Friends, and call to minde what is farr  
out of sight. By this *Apelles* shewed to  
King *Ptolomy* the servant that brought  
him to the Kings Dining-Chamber, by  
drawing his picture on a wall w<sup>th</sup> a coal,  
when hee could not finde his person. By  
this, antient Histories are acted (in a  
dumb shew before us, and every real be-  
comes a book; wherein the most igno-  
rant man can reade something, and un-  
derstand by the *pencil* what he cannot by  
the *pen*. S<sup>t</sup> Gregory spoke right enough  
in this : *quod legentibus Scriptura, hæc Idi-  
otis pictura præstat cernentibus; quia in  
ipsa etiam ignorantes vident, quod sequi de-  
beant, in ipsa legunt qui litteras nesciunt.*

And becaute the eye is a better infor-  
mer than the ear, and conveighs things  
more effectually to the minde, and im-  
prints them deeper; therefore some vi-

fible Representations are as usefull for our instruction as those things that wee take in at the ear. Upon this consideration, that excellent *Emblem* of Mortality called *Chorea Mortuorum*, or *Deaths-dance*, that was pourtrayed on the wall of a Church in the Town of *Basil* in *Germany* being decayed with time, was thought fit (by the *Edicts* or publique Surveyors of that City) to be renewed; *ut qui vocalis pictura divina monita securi audiunt, mutæ saltem Poeseos miserabili spectaculo, ad seriā Philosophiam excitentur*, as the new Inscription there speaks.

This Art had but rude beginnings, as all others had; the *shadows* of men projected upon the ground or the wall, gave it birth; whence pictures are termed *shadows*, which very name betrayes their original. A Coal was at first both the pencil and the colour, and a white wall was their table and canvas.

*Pictorum Calami carbones, mania Chartæ.*

From one colour they rose to ten; they have *decem palmarios colores*, as *Bublinger* saith; ten colours of principal note,

note, besides others. Painters (of old) were desired to set a name on every thing they drew, that men might know what they meant.

Thus it was, when this Art was yet *ἐν τοῖς ἀρχαίοις* (as *Ælian* speaks) in its swatches and cradle. At first they pourtrayed but the bare Lincaments and natural Representations of things in one solemn posture and scheme called *μονοχρόμα*, and *Aristides* the Theban was the first, *qui animum pinxit & sensus*, saith *Pliny*; that added the *Ethick* part of Painting, and expressed the passions with his pencil; that made his *mute* tables to laugh or weep, smile or frown, as the drift of his *fancie* suggested unto him.

*Apelles* brought this Art to perfection, as the same *Pliny* affirms; for hee surpassed *omnes prius genitos, futurosque* <sup>l. 35. Hist. Nat. c. 10.</sup> *postea*, as hee saith; all that went before him or ever should come after him. He painted things that could not be painted, as *Lightening* and *Thunders*, as *Pliny* relates of him, *l. 3. c. 10.* Paint mee a voice (saith the Angel in *Esdra*s), and call back yesterday; intimating both to be impossible. His Master-piece was the picture

picture of *Venus* rising out of the Sea, and wringing the water out of her disheveled hair. This was called 'Απειρίτη ἀραδυσμένη, whereof *Ovid* makes mention, l. 4. de *Ponto*.

*Ut Venus artificis labor est &  
Gloria Coi,  
Æquoreo madidas qua premii  
imbre cumas.*

When this *Apelles* came to *Rhodes*, where *Protophenes* (another famous Painter) lived, he went to his house, and not finding him within, he drew with a pencil a straight line, very small and slender, and left it as a challenge, and went his way: *Protophenes* coming home and finding this line, did guess that *Apelles* had been there, and thereupon drew another line through the very midst of that line of *Apelles* with a different colour, which was (in effect) an answer to the challenge; *Apelles* returning again to *Protophenes* his shop, and finding a line most artificially drawn through the midst of his, took the pencil and drew a third line in a different colour, from the two former, *nullum relinquens amplius subtilitatis locum* (saith my Author) leaving

no room for further art or subtilty, and so was *Victor* in this invention.

However, *Protophenes* was esteemed nothing inferior to *Apelles*, whom *Petronius* mentions; *Protophenis Rudimenta cum ipsius natura veritate certantia, non sine quodam horrore tractavi*, saith *Petronius Arbitrator*.

There is a pretty story in the same *Pliny* to this purpose, touching *Zeuxes* and *Parrhasius*, two famous Artizans and Masters of the Pencil in their times: for *Quintilian* calls this *Parrhasius* the *Legislator* among the Painters, that is, one that gave Law to all others in this Art, l. c. 12. c. 10. *Zeuxes* for his Master-piece hung forth a Table wherein he had drawn a Boy carrying Grapes in his hand, which were so lively done, that the Birds flew to the Table to peck at the Grapes: But *Parrhasius* painted a Curtain upon a Tablet so artificially, that *Zeuxes* thinking it had been a Curtain indeed, stretcht his hand to draw the Curtain aside, that he might see the picture which he thought to be behinde it; at which error he was so abashed, that he yielded the best to *Parrhasius*, adding this ingenuous confession, That *Zeuxes* his

his piece had deceived but silly Birds, but that of *Parrhasius* deceived an Artist.

The same *Zeuxes* painted an Old Woman so lively and so deformed, that he died with extream laughter at the spectacle and his own ridiculous fancy and conceit therein, as *Quercetan* reports in his *Dietat. Polyhist.*

*Pliny* makes mention of some Women painters; and of one *Lala* a Virgin of *Cyzicum*, that drew her own picture by a Glass: and *Mountaigne* in his *Essaies* speaks of a picture which he had seen at *Barleduc* that *Ren King of Sicily* had made of himself and presented to the French King *Francis the Second*.

It is a pretty Art, that in a pleated paper, and table furrowed or indented, men make one picture to represent several faces; as one I have seen, that looking from one place or standing, represented *Edward the Sixth*; from another, *Queen Elizabeth*; and from a third place, *King James*. Another I read of, that being viewed from one place, did shew the head of a Spaniard, and from another the head of an Ass. This was the conceit of a Frenchmen (I believe)

believe) who can neither speak well nor think well of a Spaniard.

One of the late *Chancellours of France* had in his cabinet a picture w<sup>ch</sup> presented to the common beholder a multitude of little faces, which were the famous Ancestors of that noble man; but if one did look on the said picture through a *Perspective*, there appeared onely the single pourtraiture of the *Chancellor* himself: the Painter thereby intimating, that in him alone were contracted all the virtues of his Progenitors. So the ingenious translator of *Pastor Fido* in his *Epistle Dedicatory* relates. Mc Fan-  
shaw.

Painting in Oyle is a modern Invention, which was wanting to the full complement and perfection of this Art; for hereby Colours are kept fresh and lively from fading, and pictures are made to bear against the injuries of time, air, and age; when their *Prototypes* and originals cannot, notwithstanding all the *Fucuses* and *decorations* and *Adulteries* of Art among our Women-painters, who can never repair the decayes of nature with all their boxes and shops of *Minerals*.

The

The Art of Sculpture or Engraving in brass (which the French call *de taille Douce*) is near of kin to this art, and herein to be preferred before it; for that when a picture in this kinde is finished upon a table of Brass or Copper, or the like mettall, a thousand Copies may be taken of it (by the help of a Rolling-Press) in a few hours space, as in Printing, when one page of a leaf is set and composed, that one form will serve to make a thousand more by it, and that in a trice, whereas a picture in colours is not so soon copied out.

But the highest piece of perfection in this art (in my judgement) are those perspective pieces which do represent Temples, wherein the vulgar eye discerns nothing upon the Tablet but arched lines and steps, degrees, or ascents; but with a Perspective glass you may see (as it were) the inside of a Temple at full length with the arched roofs above, & windows on each side: Some Statues cast in brass do shew much wit and art. The brazen Cow of *Myron* is made famous by the Epigram of *Ausonius* translated out of Greek, which was so lively done, that Bulls passing by thought to cover her; as the

the Poet (if he do not over-reach) informs us.

*Bucula sum, cælo genitoris facta Myronis*

*Ærea, nec factam me puto sed gentem.* *Ausonius Epig. 57.*

*Sic me Taurus init, sic proxima bucula Mugit*

*Sic vitulus sitiens ubera nostra petit: Miraris quod fallo gregem? Gregis ipse Magister*

*Inter pascentes me numerare solet.*

But the chiefest of this art of Foundry or Imagery was *Lysippus*, who did cast one Image of brass so rare and exquisite, that Artificers called it the *Canon*, that is, the rule or standard from whence all Artists must fetch their Draughts, Symmetries, and Proportions, as from the pattern and most absolute Master-piece. *Plin. l. 35. cap. 8.*

Of late times the Italians and Germans do surpass in these Arts, *Michael Angelo Buonarota* of *Florence*, was both an Architect, a Painter, and a Sculptor.

——— *Veras depingere formas,  
Naturam ipse doces, victam subigisque  
fateri:*

*Dextra*



*Dextra sed ingenio non infælicior, & te  
Nobilitant Calami, sicut cælo atq; colores*  
So one of his countrymen writes of him.

*Albertus Durerus* of *Norimberg* was not inferior to *Apelles*, as *Wimphelingius* tells us; *Van Dijk* a Dutchman was very famous in *London*, and attained to very great wealth by his art; *Paulus Rubens* of *Antwerp* is *vivum Europæ miraculum*, (if he be yet alive) as an ingenious Traveller styles him, whose Table of the Last Judgement was valued at five thousand Florins; *Tabula oppidorum opibus emptæ*; so *Pliny* of the Curiosities of his time.

The Art of Painting in Glass, which they call *Annealing*, is very ingenious: when they have layed the colours upon the Glass, they put the Glass into some hot Furnace for fifteen or twenty days to imbibe the colours: This art was known unto the Ancients, as *Bullinger* is perswaded, and cites a Distich of *Martial* for it;

*Non sumus audacis plebeia Toreumata  
vitri*

*Nostri nec ardenti gemma feritur  
aqua.*

But

But the Poet means no such matter there, but he speaks of certain cups made of Chrystal, or some subtiler and finer sort of Glass which cannot brook hot water, as common glasses can, but crack presently when it is poured into them, as appears by his words in another Epigram which give light to this;

*Nullum sollicitant hoc Flacce torreamata  
furem*

*Et nimium calidis non vitiantur  
aquis.* l. 12. Epig. 57.

The Ægyptians had a device of making pictures in their fine linnen cloth, which was thus; when they had drawn the colours upon the cloth, and those pictures & fancies they thought fit, nothing would be seen upon the cloth until they had cast it into a cauldron of boyling water, wherein certain herbs and juyces had been boiled, and having soaked them there, in a little while they drew them forth with perfect and lively pictures; so *Bullenger de Pictura & Statuaria*, lib. 1. c. 12. out of *Pliny*.

To work pictures not only upon cloth but in cloth, to inlay and incorporate them

Hi

them

them (as it were) into the very substance and contexture of the Webb, and that so lively, as the Pencil can scarce mend them, as we have seen in Carpets and Chamber-hangings, which is an art no less subtle and ingenious then any of the rest. These are called *Pictura textiles* by *Tully l. 4. contra Verrem*, & by *Lucret. l. 2.* By this Art we have Fountains, Gardens, and Forests in our chambers, Roses that never fade, Flowers that look fresh all the year, also Groves and Forrests that are alwaies green, with all manner of Beasts and Birds therein, with chases and Hounds so lively represented, that there wants nothing but noise and sound to make up the Game, as *Martiall* said of the carved Fishes made by *Phidias* so lively, that there wanted nothing but water to make them swim.

*Artis Phidiacæ toreumaclarum  
Pisces Aspicis? adde aquas, natabunt;  
Phidias did these Fishes Limn,  
Add but water, they will swim.*

The Babylonians were the first that taught this art, as *Polydor Virgil* acquaints us: But the Artificers of *Arras* in *Flanders* whence our rich *Arras* is fetcht, & called *Arras-work*, are not thought inferiour

to any Nation in this Workmanship. I will conclude this chapter with *Mosaick* work, which the French call *Marbuetrie*, the Latines *Museum*, and *Musivum opus*, the Greeks *λιθόεργον*, it's a work wrought with stones of divers colours, mettals, marble, glass, and all wrought into the form of knots, flowers, and other devices, with that excellency of cunning, that they seem all one stone, and rather the work of nature then art. The Ancients were not ignorant of this Art, see *Pliny lib. 36. Nat. Hist. cap. 25.* and more copiously in *Balenger, de Pict. l. 1. c. 8.*

The picture of *Laoco* and his two sons with the serpents clasping about their middle, according to *Virgil's* description in the 2<sup>d</sup> of the *Aeneis*, is now in the Popes Palace at *Rome*, and is esteemed the most absolute piece of Art in the whole world, and which *Mich. Angelo* (one that could well judge of such things) did not stick to call *artis miraculum*, the miracle of art, as *Laurent. Schraderus* in *l. 2. of the monuments of Italy*. It is a piece of antiquity, mentioned by *Pliny*, laboured by three *Rhodian* Sculptors, that were the excellentest in their times, as the said *Pliny* hath recorded.

## CAP. VII.

## Υ Φ Α Ν Τ Ι Κ Η :

O R,

*The Art of Spinning and Weaving ; with the several Materials of Garments among sundry nations.*

l. de Pall.

**W**EE come now *ad Vestificina ingenia* (as *Tertullian* speaks) to the Art of *Spinning* and *Weaving*; which, though they be vulgar Occupations, yet are no vulgar *Mysteries* and inventions, as appears by the various instruments that are used for both. The former invention, to wit *Spinning*, is ascribed to less Deity than *Minerva* the Goddess of Wisdom: *Ovid* calls it

πολυδαί-  
δελον ἵσον  
ὑφαίνειν,  
Hes.

— *Divina Palladis artem.*

Hec

Hec that considers the Wheel, the Wherve, the Spindle, with other Tacklings and *Accountrements* that belong to Spinning, with the fabrick of the Loom and Shuttle, and other instruments of Weaving, will confess that it was no vulgar wit that devised and framed them.

In *Dantzick* in *Poland* there was set up a rare invention for weaving of 4 or five Webs at a time without any humane help; it was an *Automaton* or Engine that moved of it self and would work night and day : which invention was suppress'd, because it would prejudice the poor people of the Town; and the Artificer was made away secretly (as 'tis conceived) as *Lancellotti* the Italian Abbot relates out of the mouth of one Mr *Muller* a *Polonian* that had seen the device.

The first Garments that wee read of, were made of Figg-leaves sowed together, as our first-parents did, *Gen.* 3. 7. *Paul* the *Hermite* ( desirous to take the thriftiest way and simplest to live) made him a suit of the leaves of *Palm-trees*.

H 3

*Nexilis*

*Nexilis antefuit vestis, quàm tex-  
tilis unquam.*

Suits of the primitive fashion were made of the skins of Beasts, which men killed for food : *cùm antea induvia hominum, erant brutorum exuvia*, Hecurn, l. i. Spinning is a subordinate Art to Weaving, and therein *Arachne* was excellent in her time, and presumed so much on her skill that shee challenged *Pallas* herself to a tryal of skill in this Mystery.

—— *Tantus decor affuit arti,  
Sive rudem primos lanamglomera-  
bat in orbes,  
Seu digitis subigebat opus repetitaq;  
longo  
Vellera molliabat, nebulas æquantia  
tractu.*

Whether shee orb-like rowl'd the  
ruder wool,  
Or finely fingered the selected Cull,  
Or draw it into cloud-resembling  
flakes,  
Or equal twine with swift-turn'd  
Spindle makes.

A.

As thread is spun and made of wool, silk, hair, hemp, flax and the like : so cloth is weaved and webs are made of these several sorts. The nettle affords a kinde of thread like hemp, whereof Nettle-cloth is made. I have seen cloth made of the innermost bark of a tree ; Mr *Purchas* makes often mention of the like ; *Strabo* of the *Massagetes* hath the same : *Massageta vestiuntur libris arborum, quòd lanà careant*, *Strabo* l. i. i. *Geogr.* And *Purchas* saith farther, That of certain *Palm-trees*, Velvets, Sattens, Damasks, and Taffita's are made, in the 6<sup>th</sup> book of his Pilgrimage and description of *Africa* : which Art the *Europeans* are ignorant of, I suppose. The *Mexicans* make cloth of the bark of the *Maguei* that famous Tree, which bears the *Coco* which wee call *Coker-nut*, and which is a *Cornu-copia* of it self, as *du-Bartas* describes it.

—— which serves in *Mexico*  
For weapon, wood, needle, and  
thread, to sow,  
Brick, honey, sugar, sucker,  
balm and wine ;  
H 4 Parch-

Parchment, perfume, apparel,  
cord and line.

Monfieur *Peyrefc*, that great ftorer and preferver of the rarities of Art and Nature, had a kinde of a Pumpion brought from *Mecha*, that was thready within like filk; and hee had alfo a little web of cloth that had been made of that thread, which was very good filk, as Dr *Gaffendi* relates in the life of the faid *Peyrefc*. Befides this, there is no *Sericum vegetabile*, no vegetable filk, as fome have fupposed; there is no fuch delicate wool as to make filk of, growing upon the leaves or barks of trees, as *Virgil* fings of the *Athiopian* and *Cathaian* Forrefts.

Georg. l.2.

*Qui nemora Athiopum molli ca-  
nentia lana,  
Velleraq; è foliis depectunt tenuia  
seres?*

Whofe miftake *Pliny* hath followed, fpeaking of the *Seres lanificio fylvarum nobiles*, &c. in the 6<sup>th</sup> book of his *nat. hift.* c. 17. & *Indos fua arbores veftiunt*: which Authors *Lipſius* follows in his  
Commen-

Commentaries on *Tacitus*. But, the truth is, that filk is made and ſpun out of the bowels of a little Grub or worm, which is called the Silk-worm, which feeds upon lettices and the leaves of Mulberries, and no otherwife, as *Fulius Scaliger* learnedly ſhews in his *Exercitationes* againſt *Cardan*. *Exer.* 159. c. 9. and the *Seres* or people of *Cathaia* were the firſt that made uſe of this Spinners thread, and keemed it and weaved it into a web, from whence it hath the name of *Sericum*: from them it came firſt into Europe, *tam multiplici opere, tam longinquo orbe petitur, ut in publico Matrona tranſluceat*, ſaith the excellent *Pliny*, who inſerts many a moral leſſon among his natural obſervations: ſo far theſe thin aery ſtuffs, this *ventus Textilis* (as *Petronius* calls it, and ἀέρας ὑφαντός as *Gr. Naſtanzan*) is fetched, that it may be fit for Ladies; who delight in ſuch diaphanous weares and foreign wares: it was of high eſteem in all ages.

This precious fleece was onely  
uſed to adorn

The ſacred loynes of Princes  
heretoforn,

ſaith

saith the divine *Bartas*. And in another place;

—flecces fit for Princes robes  
In *Serean* forrests hang in silken  
Globes.

But not growing naturally upon the trees, but spun by the worm that feeds upon them in the forrest.

One *Pamphilia* of the Isle of *Coos* was the first that weaved silks: whence *Coa vestis* properly is used for silk; the first that wore a garment hereof in Europe, was the Emperour *Marcus Aurelius Antoninus*. The worm was first brought into Europe in the Emperour *Justinians* time, by certain Monks that had travelled *Catbaia*: They brought the eggs only to *Constantinople*, and then hatched the worms by putting the eggs in warm dung.

The *Spiders* lawn or web which he hangs upon the hedges, and (sometimes) in our windows, though it affords matter of wonder to the considerate beholder, that shall observe the accurateness and evenness of the thread, and the *Geometry* and regularity of the work in all points, yet it is of no use, except the sight of it hath (perhaps) given a hint to the art  
of

of Weaving. Only in the *Summer Islands* and in some other parts of the *West-Indies* there are Spiders that (in Summer) spin perfect raw silk, both in substance and colour; the thread so strong that birds are entangled therein. These spiders are bigger than ours, and of rich, orient colours, as *Oviedo* the Spaniard hath related, and Captain *Smith* our Countrey-man in his description of those *Islands*.

The Prophets of old wore garments made of Hair, whence *Elias* is called *vir pilosus*, the hairie man, 2 *Reg.* 1.8. *S<sup>t</sup> John* the Baptist had a garment made of Camels hair, *Matth.* 3.4. Grograms are made of Goats hair, pulled from off their backs: which kinde of Goats, *Babequius* reports that he had seen in *Asia*, whose hair was very fine and glistering, not inferior to silk, and hanging to the very ground: they have four horns, saith *Seal*, *Ex.* 199. *Camelots* or *Chamlets* are made of Camels hair, which is so fine, especially those of *Persian* race, that they may compare with *Milesian* wool for fineness, as *Alian* reports, and the great ones used to wear thereof in those Countries.

Flax

Flax and hemp were first drest in Ægypt; *Fine linnen, with broydered work, and sails, first came from Ægypt*, saith the Prophet *Ezek. c. 27. v. 7.* and the Ægyptians are decyphered by this *periphrasis* in *Isalah, They that work in fine flax, and weave Net-works, Isa. 19. 9.* The Ægyptian priests did alwaies weave linnen in the Temples, and therefore are termed *linigeri*; so did the Jewish Priests, their Ephods, Miters, and other Vestures were linnen; and so the Priests of most Nations,

*Velati lino & verbe na tempora vineti.*

Virgil.

Of finest Flax their Vestures are,

And on their heads they vervain wear

The fine linnen so often mentioned by *Moses* for the holy garments, is made of the Bombase or Cotton that grows in balls upon certain shrubs; which kind of shrub is termed *κελοξύλον*, by *Theophrast*, the Wool-bearing Tree, and *ξύλον* simply, the Tree; whence *Linum Xylinum* in *Tremellius* his Translation is still rendred in the English Bible *fine linnen*; so that the fine linnen vestments of the Priests were made of Bombase, as the learned *Salmasius* hath observed in his Exercita-

tions

tions upon *Solinus*: so that the wool-bearing Trees in *Æthiopia* which *Virgil* speaks of, and the *Eriophori arbores* in *Theophrastus*, are not such trees as have a certain wool or dowl upon the outside of them, as the mall-Cotton, but short trees that bear a ball upon the top, pregnant with wool, which the Syrians call *Cott*, the Grecians *Gossypium*, the Italians *Bombagio*, and We *Bombase*.

But I believe that some part of their vesture was also of Flax, *Mundissima lini seges indatui & amictui sanctissimis Ægyptiorum Sacerdotibus usurpatur*, saith *Apuleius* in *Apologia*.

*Hadrianus Junius* a most learned man in his description of the *Netherlands*, doth highly extol the fine linnen made by the soft hands of the *Belgick Nuns* in *Holland* and the Town of *Cambray*, called from thence *Hollands* and *Cambricks*; *quarum cum nive certat candor, cum sindone tenuitas, cum bysso pretium*; so he speaks of them, and calls them *Regum & Reginarum precipuas delicias*; the chieft delight of Kings and Queens.

There is a certain Shell-fish in the Sea called *pinna*, that bears a mossie dowl or wool whereof cloth was spun and made,

as

as *Tertullian* speaks in his book *de pallio*. *Et Arbusta nos vestiunt, & de mari vellera*. These are his words; not only Trees afford wool, but also the Sea to clothe us withal; this wool or moss is so soft and delicate, that it is nothing inferiour to silk saith *Lacerda*, and therefore he calls it *Bysum marinum*, Sea silk, in his notes upon *Tertullian*, though the true *Bysus* be lost, and also the *Carbasus*, whence *Carbasina vestes*, insomuch that great Clerks can scarce tell us what they were, but that fine Stuffs were anciently made of them. One *Ferdinand Imperatus*, a Drugster of *Naples*, a great storer of exotique and domestique Rarities, had some of this Sea-silk both weaved and unweaved, and also the Shell-fish that did bear it. Men have found a way not only *arbores Nere*, sed & *lapides*, not only to spin threads from Trees, as *Tertullian* speaks of the *Seres*, but also from stones. There is a stone called *Lapis Caristius*, and *Lapis Cyprius*, from the Countries that this stone or mineral is found, to wit *Cyprus* as *Strabo*, and mount *Caristus* in *Attica*, as *Trallianus* and *Dioscorides* report; it is like Alom in colour, and being beaten with a Mallet, it shews like a small hair, therefore

therefore called *Trichitis*, or the hayrie stone by some Greek Authors, & *Alumen Plumaceum*, or downy Alom, by the Latinists it is also called for the resemblance of it, *villus Salamandra*, Salamanders wool: This hair or dowl is spun into thread, and weaved into cloth, and the cloth so made hath this strange property, that being cast into the fire it will not burn, but if it be foul or stained, comes forth more bright and clean out of the flames; it is therefore called also *Amiantus*. *Ferdinand Imperatus* (before mentioned) had a piece of this cloth much like white silk. Of this hairy stone some made wick for candles that would not consume or burn out: such a candle was made by *Callimachus*, and hung up in the Temple of *Minerva* at *Athens*, as *Salmasius* relates in his *Pliniana exercitationes*. Langii Epist. Medicin.

There was a vegetable of this kinde, a sort of Flax called by the Grecians *Asbestos* and *Asbestinos*, that had the like property with the mineral before mention'd, saith the same *Salmasius*, whereof *Pliny* makes mention in l. 9. of his History, c. 1. and calls it Indian flax, and *linum vitum*, quick inconsumptible flax. *Solinus* makes mention of some sayls made in *Crete* of this



this stuff, *quæ inter ignes valebant* (as he saith) that would not take fire, if it hath this property indeed, it is pity to put it to such vulgar use as to serve for sayls, that would better serve at our tables; for if men had table-clothes and napkins of this stuff, they might prefer them before Diapers and Damasks, for it would save some cost & no small trouble in washing and drying such household implements, it is but throwing them into the fire, and they are presently washed and dried at once.

*Pliny* indeed esteemed it equivalent to pearl and precious stone, for it was hard to be found, and difficult to be weaved, for the shortness of it (as he says) the bodies of Kings were used to be wrapt in this kinde of cloth when they were to be burnt, that the ashes might be preserved unmixt, for to be laid up in urns or pitchers, as the manner then was.

*Pliny* saw some Napkins of this sort in his time, and the experiment of their purifying demonstrated. One *Podocattar* a Cyprian Knight, and who wrote *de rebus Gypriis* in the year 1566. had both flax and cloth of this sort with him at *Venice*, and one *Thomas Percacchius* hath  
seen

seen the same in that Knights house, and many others with him, as he relates in his work concerning the Rites of Funerals. *Ludovicus Vives* also saw a Towel of that kinde at *Louaine* in *Brabant*, as he relates in his Commentary upon *S<sup>c</sup> Augustine de Civitate Dei*, l. 21. c. 6.

*Baptista Porta* saw the same at *Venice* with a woman of *Cyprus*, and calls it *Secretum optimum, perpulchrum, perutile*, a very useful and profitable secret, *Nat. Magia*, l. 4. c. 25.

As stones and trees have been spun and weaved into cloth, so some mettals may be wrought to that use; *Attalic* garments were weav'd all of gold & thread, which sort of Vesture the Italians call *Veste di Brocato di oro*: Such a garment *Mary* the wife of the Emperour *Honorius* was buried in; for her Marble Coffin being digged up at *Rome* in the year 1544. where the foundation of *S<sup>c</sup> Peters Church* was laid, all her body was found consumed save the Teeth and a few bones, but her golden apparel was fresh; out of which (being melted) was extracted 36 pounds weight of pure gold, as *Aldou- rand* relates in the first book of his *Museum Metallicum*. The Sidonians made  
I the

the like kinde of garments, as appears by these verses in *Virg. Æn. xi.*

*Tum geminas vestes ostroq; auroq; rigentes*

*Extulit Æneas, quas illi læta laborum  
Ipsa suis quondam manibus Sidonia  
Dido*

*Fecerat, & tenui telas discreverat auro.*

*S<sup>t</sup> Hierom* in one of his Epistles, and *Paulus Diaconus* do make mention of a sort of wool that was rained down in the year 1119 in the Reign of *Valentinian* and *Valens*, which fell most about *Airekatum*, or the Province of *Artois* in *Flanders*, which was spun into cloth, and did much enrich the Country thereabouts.

The heavens rained down meat once for the people of Israel, now it rains down clothing; as there was *cælum escatile*, as *Salvian* speaks of the admirable *Manna*, when men did eat Angels food, so here was *cælum textile*, as I may so term it; the sky affords both food and rayment! Some of this wool in memorial of the miracle, is preserved to this day in the chief Church of *Arras*; to wit, *S<sup>t</sup> Marie's Church* there.

*l. i. de Prov.  
vid.*

De

## De Plumificiis.

### An Appendix of the Plumary Art.

**I**N *Florida*, and other places of the *West Indies*, the Inhabitants make garments of Feathers with marvellous Art and Curiosity; as also rare and exquisite pictures; for in those Countries there are Birds of rare plumage, of very gay and gaudy colours, that have a gloss like silk, and put down the pride of the Peacock; some are of orient green, and some of excellent carnation and scarlet, more especially in their *Phenicopters*, *Parrots*, and *Tomincios*.

Their manner is to strip the Feathers from the Quills with neat pincers, and then to joyn them together with paste, mingling variety of colours in such a rare medley, that they make a very glorious shew. *Ferdinando Cortes* the Spaniard found abundance of these curious works in the Palace of *Moteczuma*, the wealthy Emperor of the *Mexicans*, which were such and so excellent, that none could make in silk, wax, or of needle-

work any things comparable to them; so he speaks in his second narration; and in his third he adds this, that they were so artificial and neat, that they cannot be described in writing, or presented to the imagination, except a man sees them.

Cardinal *Paleotus* had the picture of *S. Hierom* kneeling before a Crucifix made of this Workmanship, which was sent him from *Spain*; some Fryers that had resided in those Countries of *America*, had learn'd the Art (it seems) from the Natives.

These pictures are made so accurately, that it would pose a judicious eye to discern or distinguish them from those that are made with the pencil, or the art of the painter.

This art was not unknown to the Ancients in this Hemisphere of the world: *S. Hierom* makes mention of *operis Plumarii*, this plumary workmanship, in his Commentary upon *Exod. l. 26. 1.* and on chap. 39. of *Exod. v. 29.*

*Seneca* makes mention of it in his Ep. 90. *Non avium pluma in usum vestis conservantur, &c.* So also *Fulius Fermicus l. 3. Astronom. c. 13. & Prudent. in Hamartig.*

Hanc

—Hunc videas lascivas prapete  
curfu

*Venantem tunicas; avium quoq; versiculorum*

*Indumenta novis Texentem plumea telis.*

If this art be lost in the old world (as indeed we can no where finde it on this side the Globe) it is preserved (it seems) in the new, and that in the highest perfection, insomuch that it puts down not only the admired pieces of *Zeuxes* and *Apelles* of old, but also those of *Michael Angelo*, and *Raphael Urbin* of later times: and the plumes of those birds seem to surpass all their colours, not only for luster and beauty, but also for duration and lasting.

See more of this Art in the learned *Fuller* his *Miscellanea sacra, l. 4. c. 20.* in *Jos. Acosta l. 4. La Gerda* his *Adversaria sacra. Pancirol. de novo Orbe tit. 1.*

CAP.

work any things comparable to them; so he speaks in his second narration; and in his third he adds this, that they were so artificial and neat, that they cannot be described in writing, or presented to the imagination, except a man sees them.

Cardinal *Paleotus* had the picture of *S<sup>t</sup> Hierom* kneeling before a Crucifix made of this Workmanship, which was sent him from *Spain*; some Fryers that had resided in those Countries of *America*, had learn'd the Art (it seems) from the Natives.

These pictures are made so accurately, that it would pose a judicious eye to discern or distinguish them from those that are made with the pencil, or the art of the painter.

This art was not unknown to the Ancients in this Hemisphere of the world: *S<sup>t</sup> Hierom* makes mention of *operis Plumarii*, this plumary workmanship, in his Commentary upon *Exod. l. 26. 1.* and on chap. 39. of *Exod. v. 29.*

*Seneca* makes mention of it in his *Ep. 90. Non avium pluma in usum vestis conservantur, &c.* So also *Julius Firmicus l. 3. Astronom. c. 13. & Prudent. in Hamartig.*

Hanc

—Hunc videas lascivas prapete  
cursum

Venantem tunicas; avium quoq<sup>ue</sup> versiculorum

Indumenta novis Texentem plumea telis.

If this art be lost in the old world (as indeed we can no where finde it on this side the Globe) it is preserved (it seems) in the new, and that in the highest perfection, insomuch that it puts down not only the admired pieces of *Zeuxes* and *Apelles* of old, but also those of *Michael Angelo*, and *Raphael Urbin* of later times: and the plumes of those birds seem to surpass all their colours, not only for luster and beauty, but also for duration and lasting.

See more of this Art in the learned *Fuller* his *Miscellanea sacra, l. 4. c. 20.* in *Jos. Acosta l. 4. La Gerda* his *Adversaria sacra. Pancirol. de novo Orbe tit. 1.*

CAP.

## C A P. VIII.

## M O Y Σ I K H :

O R,

*Of the Art of Musick, with  
sundry Instruments there-  
unto belonging.*

**T**HERE is Musick in heaven and Musick on the way thither, in the sphears, as the Pythagoreans affirm: and therefore the soul of man being descended from heaven, & passing through those harmonious sphears, doth naturally delight in Harmony: *Anima in corpus defert memoriam Musicae, cujus in caelo conscia fuit*, saith *Macrobius*. l. 2. *in somn. Scipionis*. Nay, God made the body of man (wherein this musical soul is to sojourn) a kinde of a *living Organ* or Musical instrument: *Life is an harmonious Lesson* (as one saith) *which the soul playes*

*playes upon the Organs of the body.* There is but one pipe to this *Organ* (to wit) the *Weasand*; the *Lungs* are the bellows to make winde, and to inspire this pipe; yet with this one pipe (being variously stopt) we can expresse a thousand sorts of notes and tunes, and make most ravishing musick; for there is no Harmony that is so delightfull and pleasing to man as *vocal*, or the musick of man's voice.

In imitation of this musical pipe in the throat of man, men devised to make musick with a *Syringe* or *Reed*; which being bored with holes, and stopt with the fingers, and inspired with mans breath, was made to yield various and delightfull sounds. This was *Pastoral Musick* or *Shepherds Delight*, and was the invention of *Pan* the God of Shepherds, and of the *Arcadian* plains, in those golden days.

*Pan primus calamos cerâ conjun-  
gere plures  
Instituit.*—Virg. *Ecl.* 2.

Whence the Poets have feigned *Pan* to be in love wit a *Syrinx*, a Nymph of  
I 4 that

that name, but (in the moral) in love with that Pastoral musick of the Reed then in use. *Lucretius* doth ascribe the first hint of this Pastoral musick to the *whistling* of the winds among the reeds, in his 5<sup>th</sup> book.

*Et Zephyri cava per calamorum  
sibila primum  
Agrestes docuere cavae inflare  
cicutas,  
Inde minutatim dulces didicere  
querelas,  
Tibia quas fundit digitis pulsata  
Canentium.  
Avia per nemora ad sylvas saltusq;  
reperta,  
Per loca Pastorum deserta, atque  
otia Dia,*

By murmuring of winde-shaken  
reeds, rude Swaines  
Learnt first of all to blow on  
hollow Canes,  
Then pipes of pieces framed,  
whence Musick sprung  
Played on by quavering fingers  
as they sung,

Devis'd

Devis'd in shades and plains;  
where shepherds graze  
Their bleating Flocks with  
leasure-crowned layes.

In imitation of the Reed, some have made tunefull pipes of the shank-bone of a Crane, which is called *Tibia*; from whence the pipe is also called *Tibia*, or a Flute, and he that playes thereon *Tibicen*, a *Flutnist*. This was called *Manulos* (as *Pliny* testifieth) that is, single or simple Musick, and therefore probably the first; for men naturally do light upon single or simple notions, before mixt or compound, and begin with plain things before they proceed to finer curiosities; as plain songs were before decants and *chromatic-moods*.

There were Musical Instruments in the world before *Pans* time. *Jubal* the son of *Lamech* was *pater omnium tractantium citharam & organon*, as the holy Spirit speaks, *Gen. 4. 21. pater*, that is, in Hebrew sense, the Author and Inventor of the Harp and Organ, but what kinde of Instruments these were, *Moses* doth not inform us.

The *Ægyptian Mercury* was the first  
Inven-

Inventor of the Lyre or Harp. *Horace* calls him *curva lyra parentem*. The Invention was casual, thus : Finding a Tortoise-shell near the Nile-side, to the which some nerves or strings did hang, reaching from the one end to the other ; these strings having been dried by the sun and well stretched, and being accidentally touched with the fingers, gave a shrill sound or twang from the hollow of the shell ; which gave him (being sagacious) a hint of framing the Lyre, or (as others say) the Lute. As *du-Bartas* (for one) who speaking of this *Mercury* and the Tortoise-shell, sings thus, in his *Handicrafts*.

And by this mould frames the  
melodious Lute,  
That makes woods hearken and  
the stones be mute ;  
The hills to dance, the heavens  
go retrograde,  
Lions be tame, and tempests  
quickly vade.

Indeed, the *Lute* doth much resemble  
the Tortoise-shell, and from that resemblance

blance it is called *Testudo*. So in *Propert.*  
*lib.2.*

*Tale facis carmen docta testudine,  
quale  
Cynthis impostis temperat Art-  
culis.*

What some have invented, others have perfected : *Terpander* made a Lyre or Harp of seven strings which before had but three, answerable to these three principal notes of *Treble*, *Mean*, and *Base*.

*Obloquitur numeris septem discrimina vocum.*

*Simonides* added an eighth string, and *Timotheus* a ninth, and holy *David* makes mention of a *Decachord* or ten-stringed Instrument.

Many Instruments have been invented by *K. David* for to be used in Gods service. But all sorts of these *vasa Cantici*, (as *Amos* calls them, *Am.6.5.*) of these musical Utensils, are divided into *ὑμνῳδία* & *ψαλμοὶ*, I may express them in English either *Mouth-Instruments* or *hand-Instruments*, founded either with the breath of the mouth or the touch of the

the hand : Of the first sort, are all Flutes, Pipes, Trumpets, Cornets, Sacbuts, &c. Of the other sort, are the Lute, Harp, Organ, Psaltery, Virginal, &c. All Instruments of Musick were by the Latines called *Organa*, Organs. But that which is more especially called by that name, makes a grave solemn Musick like the sober *Doric*, and hath been very anciently used (with Psalmodes) in Divine Service; the Inventor whereof was King *David*, as some affirm. Since his time, men have proceeded to marvellous Curiosities both in Musick and Musical Instruments. Not many years since, there was a pair of Organs made in *Italy* that would sound either Drum or Trumpet, or a full quire of men, as the Organist pleased; so that men would think they heard boyes and men distinctly sing their parts in Consort, as *Leander Alberti* (an eye and ear-witness thereof) relates, in his description of *Italy*.

A *Neapolitan* Artizan made a pair of Organs all of Alabaster stone, pipes, keyes and jacks, with a loud lusty sound, which he afterward bestowed upon the Duke of *Mantua*, and which *Leander Alberti* saw in the said Dukes Court,

Court, as he relates in his description of *Thuscany*.

The same *Leander* saw a pair of Organs at *Venice* made all of Glass, that made a delectable sound. This is mentioned also by M<sup>r</sup> *Morison* in his Travels. Pope *Sylvester* the Second made in his younger years a pair of Organs that should play without an Organist; he used onely warm water to give them motion and sound. Such *Hydraulics* are frequent in *Italy*, that are moved with cold water as well as hot.

*Gaudentius Merula* in his 5<sup>th</sup> book *de mirabilibus mundi* makes mention of an Organ in the Church of S<sup>t</sup> *Ambrose* in *Millain*, whereof the pipes were some of wood, some of brass, and some of white Lead; which being played upon did express the sound of Cornets, Flutes, Drums and Trumpets with admirable variety and concord.

Many persons can sing very well naturally, but this natural Musick may be improved by Art, when they are taught to sing by Rules and Notes, and to govern their voices by acquired habits; and so there is an Art of Musick, as there is artificial Logick besides the natural;

*Genebr.  
Chron. ad  
Ann. 997.*



tural : but because these natural Singers  
are but few and scarce,

*Apparent rare nantes in gurgite  
vasto;*

therefore to supply this defect, some  
have musical Instruments for harmless  
pleasure and delight, to appease the cares  
of life, and for many other laudable and  
honest uses, which I shall more largely  
handle in the ensuing Appendix of the  
Power and efficacy of Musick.

### *The Power and Efficacy of Musick.*

**T**He Poets may be thought too la-  
vish, and to strein themselves be-  
yond *Ela* in praising the efficacy and  
force of Musick, when they extend it to  
things even without life and sense : when  
they sing of *Orpheus*, that trees and rocks  
and things without sense were sensible of  
his powerfull Layes ; that windes were  
silent and waters stopt their courses to  
listen to his ravishing Numbers. *Horace*

is

is much upon this string in several of his  
*Odes* ; and *Claudian* sings the same note  
in the beginning of his second book *de*  
*Raptu Proserpinae*.

*Vix auditus erat, venti sternuntur &  
unda,*

*Pigrior astrictis Torpuit Hebrus a-  
quis.*

*Ardua nudato descendit populus Æmo,  
Et comitem Quercum Pinus amica  
trahit.*

Englished.

No sooner heard, but Winds and  
Waves were laid ;  
And headlong *Hebrus* (as if frozen)  
stayd :

The lofty Poplars left high *Æmus*  
bare,

The Pine came with the Oak to hear  
his ay.

So he speaks of that rare Musician  
*Orpheus*. *Virgil* saith the like of *Silenus*,  
when he sung

*Tum vero in numerum Faunosq; ferasq;  
videres*

*Ludere ; Tum rigidas motare cacumena  
Quercus.*

*Mr Randolph's* Muse is in the same key  
in cōmendation of Musick, who because  
he

he hath expressed the power of Musick to the height of Fancy, I thought good to insert his *Rapture* in this place.

Musick, thou *Queen of Souls* ! get up  
and string

Thy powerful Lute, and some sad *Re-*  
*quiem* sing ;

Till Rocks requite thy Eccho with a  
groan,

And the dull Cliffs repeat the duller  
tone.

Then on a sudden with a gentle hand,  
Run gently o're the Chords, and so  
command

The Pine to dance, the Oak his roots  
forgo,

The Holme, and aged Elme to foot it  
too,

Myrtles shall caper, lofty Cedars run  
And call the Courtly Palm to make  
up one ;

Then in the midd'ft of all this jolly  
train,

Strike a sad Note, and fix them Trees  
again.

That Musick hath any such power o-  
ver things *inanimate* I shall suspend my  
faith ;

faith ; but that it hath a great impression upon all things endued with sence, I shall evince by good proofs.

This *Regina sensuum*, as *Cassiodor* calls it, Queen Regent of our senses, and so-  
veraign Mistris of our affections.

Of all the creatures that God made, there is none that makes Musick or Harmony but Man and Birds ; but as among men all do not sing tuneably to delight the ear if they would never so fain : So among Birds, all are not fit for the Quire or Cage ; There are but few sorts among the infinite variety of them, that are Musical. Nevertheless though all men cannot make Musick ; yet all are delighted with it ; so for birds and beasts, though all do not sing, yet are all affected with melody and singing.

But to come from the Thesis to the Hypothesis, I will descend to some particular instances, to shew the regency and power of Musick over insensible creatures.

Over the } *Rational* } Creatures.  
          } *Irrational* }

The Roman Orator in his Oration *pro*  
*Archie Poeta* tells us, that *Bestie inanes*  
K cantu

Præfat. ad  
Herod.

*cantu flectuntur, & consistunt*, that savage and innane beasts are so taken with Musick, that they will turn back and stand still to listen thereto. Henry Stephens that learned man of Paris testifieth, that he saw a Lyon in the City of London, *qui Musicen audiendi gratiâ epulas suas desereret*; that would forsake his meat to hear Musick. *Mulcentur Cervi fistulâ Pastoralis & Cantu*, says Pliny, Deer are much taken with the Musick of the Pipe; Elephants with singing; and the sound of Tabrets, as Strabo; and among all beasts there is none but the Asse that is not delighted with harmony, as the Pythagoreans affirm, Birds also and Fowl are generally affected with sweet sounds and harmony;

Ælian.  
hist. Animal. l. 10.

Martial.

*Non solum calamis, sed cantu fallitur ales.*

And

*Fistula dulce canit volucrem dum decipit Auceps,*

says the grave Caso. I heard from Falconers that singing did much conduce to the cicurating of Hawks: Nay Musick commands in all the Elements, and rules not only in the Ayr, but also in the Water among the Mutes; as that famous

story

story of Arion and the Dolphin does testify: That story is recorded by Herodotus, and Aul. Gellius, and many other grave Historians, and it was briefly thus, Arion being at Sea, and sailing towards his own Country of Lesbos, some of his companions that were with him on ship-board knowing that he had money about him, conspired to rob him, and then to throw him into the Sea; Arion being made acquainted with their purpose, and having his Harp with him, desired so much respite that he might give them a lesson for a farewell, and then let them do their pleasure; when he had ended his lesson, and (like the Swan) had sung his own Dirge and last Notes (as he thought) in this world, he was thrown over-board; but it hapned that some Dolphins having gathered together about the Ship to hear his ravishing notes, one of them (in requital of his Musick) took Arion on his back, and waisted him safe to his own shore, and there laid down his load. In memory whereof the picture of the Dolphin was set up near that shore with a Greek Distich, which Volaterran translated into Latine thus,

*Cernis Amatorem qui vexit Ariona  
Delphin:*

*A Siculo subitas pondera grata mari.*

The story is touched by *Ovid* in his third book *de Arte Amandi*;

*Quamvis mutus erat, voci favisse putatur*

*Piscis, Arionæ fabula nota lyra.*

Nay, the irresistible power of Musick reacheth deeper then the Sea, even as far as hell, it sways among the infernal fiends upon presumption of his powerful strains; *Orpheus* went down among them to fetch his wife *Euridice* from thence, as *Virgil* sings of him.

*Ausus at est manes accersere Conjugis*  
*Orpheus*

*Æn. 6.*

*Threiscia fretus lyra, fidibusq; canoris.*

On whom *Mr Brown* speaking of the commendation of *Spencer*, hath this reflexion in his Pastorals,

*Spencers  
Fairy Q.*

He sung th' Heroick Knights of Faery  
land,

In lines so elegant, and of such command,

That had the *Thracian* play'd but half  
so well,

He had not left *Euridice* in Hell.

In

In the second place, for *rational* creatures, there's nothing more evident and more commonly seen, than that all sorts of people (more or less) are affected with harmony. And with most men it hath such power over their spirits, that it can mould them into any temper; *Omnes animi habitus cantibus gubernantur* (saith *Macrobius*.) *ut & ad bellum progressus* Somn. Scipionis, l. 2. c. 3. *& receptui canatur: cantu & excitantur & sedante virtutem.* It commands all our passions as it lists, either of anger or mildeness, joy or sorrow, according to the several streins and tunes it makes, as if there were some *μυμήτα* (as *Aristotle* Polit. l. 7. c. 3. speaks) some imitations or *echoings*, some secret sympathy between the strings of the Heart and the Harp, or any other Instrument that gives melody.

To illustrate this, I will give certain historical instances or examples of each kinde.

1. Musick stirs up Anger and Courage, especially that which they call *Phrygian* Music, which consists of violent and loud notes and *sprighfull* motions,

tions, and this is usefull for the warrs; and therefore Drums, Trumpets and Cornets have been (anciently) used among most nations to encourage the souldiers in the field. *Virgil* speaking of *Misenus* (*Aeneas* his Trumpeter) gives this character of him.

— *Quo non praestantior alter  
Aere cedere viros, Martemq; accendere  
cantu.*

*Tyrteus* that brave Commander of *Lacedaemon* made use of the Trumpet against the *Messenians*, with whose unwonted sound they were much terrified, as his own souldiers were much animated therewith, as they were also with his Songs and Poems, as *Horace* testifies in his *Art of Poetry*.

— *Post hos, insignis Homerus,  
Tyrteusque mares animos ad  
martia bella  
Versibus exacuit.*—

*Horace*, who had been a souldier for some years himself, speaks of his *Barbiton* which he had used in the warr, and which

which now he meant to hang up for a monument after his return home:

*Defunctumq; bello Barbiton, hic  
paries habebit.*

2. As it stirs up Anger, so it doth allay and appease it, and conjures down that spirit which it raiseth up; *Cantando malos affectus incantamus*. *Timotheus* the Musician could both enrage and becalm the Great *Alexander* at his pleasure, onely by the different streins of his Music. *Clinias* the Pythagorean when hee began to be heated with anger, would take his *Lute* to compose his affections; and *Achilles* (the great Souldier) was wont to do the like, as *Alian* reports of them both. *Var. l. 14. c. 23.* this is *Caduceus pacis*.

The Harp is *Tela Musarum loquax*, as *Cassiodor* wittily stiles it, a speaking kind of Instrument, whereby a man speaks his passions without a tongue, and by those *verbosa stamina* doth tell his tale more effectually then he can with the natural Organs of his speech. Therefore the *Getes* (knowing the power of Musick to move clemency) did use to send harps

and Musicians with those Embassadors that went to treat for peace and amitie. *Ludovicus Pius* the Emperour did set *Theodulpus* at liberty when he heard him sing an *Anthem*, which he had composed in Prison.

3. Musick *exhilarateth* the spirits and expelleth the evil spirit of melancholy, as *David* (the sweet singer of Israel) drove (with his celestial streins) the evil spirit out of *Saul*, and put him out of possession, without any other *exorcism* then that of Musick: It seems the diuel does not love Musick; but I know nothing else but does. *Scimus Musicam Daemonibus invisam & intolerabilem esse*, saith *Luther* in *Epist. ad Senfelium Musicum*. This may be better called *Fuga Demonum* than the herb *Hyperion*. *Melancholy* is the Devils Bath, wherein he takes much delight. And therefore, since Musick is an enemy to Melancholy, we may conclude that it is an enemy to the Diuel: Musick hath too much of heaven to give him any delight; he loves jarrs and discord better than concord and harmony.

4. This does compose men to gravity, contemplation, and godly sorrow, especially the grave *Doric* Musick

sick of the Church. *Saint Augustine* did shed tears when hee heard the solemn Musick of the Church at *Millain*, as he confesseth in the 9<sup>th</sup> of his *Confessions*. Hereby our devotion is exalted, our souls lifted up to heaven with those ecchoing sounds, and our spirits better prepared and disposed for prophetick raptures and divine illuminations. When *Elisha* was desired to Prophecie by King *Jehoshaphat*, he called for a *Minstrel* to make musick, thereby to defecate and clear his spirits; and as the minstrel play'd, the hand of the Lord came upon him and he prophesied victory and good tidings to the King, 1 *King*. 3. 15. and that the Prophets did commonly use musical Instruments for that purpose, as we may learn from the first book of *Sam. cap. 14. v. 5*.

5. To these I may add in the 5<sup>th</sup> place, that Musick doth avail (not a little) to chastity, sobriety and civil conversation, as it may be used and applyed. When some young men of *Taurominum* were about to force open a house upon some women that they had a minde to, *Pythagoras* coming casually by, did appease their mindes and reduce them to a better mood,

mood, by making a Minstrel (that they had with them) to change his notes from nimble *Dactyls* or *triple* time into slow *Spondaics*, & so did becalm their hot and unruly spirits. *Spondeo resonante*, as *Cicero* relates in his *Tuscul.* and *Boetius* in *Proœmio de Musica*, and *Quintilian* also in *Orator. instit. l. 1. cap. 10.* A *Spondee* or *Spondaic* foot is a *grave* time consisting of two long syllables, so that if there be many of them in a verse, they make it to be of a slow heavy motion, like the *Spanish* gate and gravity ; as in that verse,

*Conturbabantur Constantinopolitani.*  
Whereas the nimble *Dactyls* (whereof *Galliards* consist) are æry and sprightly like the *French* disposition, and like that verse in *Ennius* (which runs all upon *Dactyls*)

*Et tuba terribili sonitu Taratantara dixit.*

The very sound and pronunciation whereof rouseth the spirits and maddeth them in a sort ; as *Aristotle* speaks of the *Phrygian* mode in Musick, that it is ὄργαστική, παθητική καὶ ἐνθουσιαστική, 4<sup>o</sup> *Polit.* It is reported of *Agamemnon*, that when he went to the warrs, he left a Musician

with his wife *Clitemnestra* for to keep her chaste, by singing grave *Doric* tunes unto her. *Modus Dorius prudentia largitor est, & castitatis effector*, saith learned *Cassiodor lib. 9. Var. c. 3. ut Phrygius pugnas excitat, & Æolius animi tempestates tranquillat.* Id.

6. Lastly, by the power of Musick rude and savage people have been civilized, & brought to humanity and gentleness, brought from Woods and Gaves to live in Towns, taught to build houses, to live under Laws and in civil society and correspondency with their own kinde ; so the *Thebans* were mollified by *Amphion*, and the rude *Thracians* by *Orpheus* : and this is the true meaning and moral of those Poetical Fables touching those two famed Musicians, as *Horace* tells us.

*Sylvestres homines sacer interpretæq;  
Deorum*

*Cadibus & victu fædo deterruit  
Orpheus.*

*Dictus ob hoc lenire Tygres, rabidosq;  
Leones ;*

*Dictus & Amphion (Thebana Con-  
ditor Arcis)*

*Saxa*

*Saxa movere sono Testudinis, &  
prece blandâ  
Ducere quo vellet.*——

*Orpheus* the Gods interpreter, from  
bloud

*Deterr'd* wilde men and savage live-  
lyhood.

Hence came the fable, that by  
Musick hee

Did Tygers and wilde Lyons lenifie:  
And hence *Amphion* (who built  
*Thebes*) is said

To have mov'd stones with his sweet  
streins, and led

Them where he would, &c.——

As Musick hath power over the spi-  
rits of man, so it hath over his body too,  
and that in two respects; partly, to keep  
it from drooping and weariness, while it  
is at work; and partly to cure it of some  
maladies, as I shall produce examples of  
both.

1. It avails to keep the-body from  
weariness and irksomness, and drooping  
from under its dayly cares, toil & labor.  
*Horace* calls his Lute *Dulce laborum le-  
nimen*, the gentle easer of labour and  
pains-

pains-taking. And *Quintilian* sayes,  
That Nature seems to have given this  
gift of Musick to mankind for this ve-  
ry purpose; and from hence it is that all  
sorts of people use commonly to deceive  
the tediousness of their dayly-task with  
some melodie. *Parrhasius* the Pain-  
ter used to sing while he was at work.  
*Cantu & modulatione submissâ, laborem  
artis mitigare solebat*; so *Ælian* tells us,  
*lib. 9. cap. 11.* The Husband-man sings  
or whistles at his work.

*Alta sub rupe canit frondator ad  
auras.*

And his good wife at her wheel at home  
makes some notes also that serve to  
please her, if they please no body else.

*Interea longum cantu solata laborem  
Arguto conjux percurrit pectine telas.*

And if men over-toyl themselves and  
betired out with labour, Musick is very  
helpfull to recreate their spirits, and to  
make them fresh and vigorous again:  
*Musica est medicina molestiæ illius quæ  
per labores suscipitur*, saith (the Patriarch  
of



of *Philosophie*) *Aristotle*. And *Tully* saith of the *Pythagoreans*, that after they had been weary with intentive studies, their usual manner was to solace themselves in the evenings with Musick, as hard students in our Universities use to do now adayes.

2. As this heavenly gift expells weariness from our bodies, so it expells some maladies too. The Old Greek Bard (*Homer*) saith, the Grecians did cure the plague with Musick, in the first book of his *Iliads*. The reason of this cure is, because Musick cheers up the spirits and expells sadness, than which nothing is more fatal in a time of Mortality, or makes the body more obnoxious to the tyranny of diseases.

*Corporibus vires subtrahit ipse timor.*  
Fear and sadness betrayeth the succours that nature hath provided for her own defence, and doth expose our bodies naked to the malignity of the air and invasion of any malady: Hereof you may finde more in the writings of Physicians, and particularly *Langius* in the 3<sup>d</sup> book of *Medicinal Epistles* tells us of *Xenocrates*, that he used to cure Phrenetick persons with songs and musick; and  
of

of *Theophrastus*, who by his own experience found that the pains of the *Sciatica* is much asswaged by Musick. They say in *France*, that Musick doth not cure the *Tooth-ach*: but yet some aches are cured by it; for *Macrobius*, to the other vertues of Musick, adds this, *Corporis morbis medetur*. But there are two diseases that are proper (in a manner) to *Germany* and *Italy*, which are cured by no other means than Musick. In *Italy*, they that are bitten with that venomous Spider called the *Tarantula* become Phrenetick, and the only way to cure them is to play upon Instruments unto them; at the sound whereof they fall a dancing, and bestir themselves so long untill they are quite tired and have sweated out the venom that was shot in by that Insect. In *Germany* also that disease which they call *Chorus S<sup>ti</sup> Viti*, or *S<sup>t</sup> Vitus* his dance, is cured with Musick. It is a kinde of a Phrensie too, and when the Patients hear any Minstrel play, *saltant ad lassitudinem simul & sanitatem*, as *Shenkius* saith; they dance presently, and never give over till they are both tired and cured.

And these are sufficient proofs to shew the  
the

the power and efficacy of Musick both over man and beast, and in man both over his body and minde. The truth is, we may observe, that *soluta Oratio*, plain prose, without harmony or meter, hath a great sway over mens mindes, if it be gracefully and pathetically delivered. The Orators among the *Grecians* had the power of fire and water, to enflame and to extinguish, to make peace or warr; such was *Demosthenes* in *Athens*.

*Juv. Sat.*

——— *Quem mirabantur Athenæ  
Torrentem & pleni moderantem frenâ  
Theatri.*

That ruled and managed the people with his eloquent and voluble tongue, as a rider doth his horse with the reins. Eloquence is *flexamina & consilium*, there is some sorcery and enchantment in a well-composed Oration. *Hierom. Savanorola*, that pious man and eloquent preacher of *Florence*, did manage that Common-wealth with his tongue. *M. Antonius milites armatos facundiâ suâ exarmavit. Vell. Paterc. l. 2. cap. 20.* And when *Ferdinand* the Second besieged *Rome*, one *Ugolin* a Friar, by a Sermon he

he made at the *Vatican*, did move all his Audienceto weep, and did so enflame their courage withall, that they took arms unanimously to beat off the enemy from the walls; and they sallied out with so good success, that they raised the seige. If a plain Speech delivered with gravity & gracefulness hath such force, how much more moving are words joy-ned with Harmony and Numbers?

All the powers and vertues of Musick which we have here at large exemplified, are briefly comprised by the Noble *Salust* in these following verses.

Sweet Musick makes the sternest  
men at arms  
Let fall at once their anger and their  
arms.  
It cheers sad souls, and charms the  
frantick fits  
Of Lunaticks that are bereft their  
wits.  
It kills the flame and curbs the fond  
desire  
Of him that burns in Beauties bla-  
zing fire.  
It cureth Serpents banefull bite,  
whose anguish

L

In

In deadly torments makes them  
madly languish.

The Swan is rapt, the Hinde de-  
ceiv'd withall,

And Birds beguil'd with a melo-  
dious call.

The Harp leads the Dolphin, and  
the busie swarm

Of buzzing Bees the tinckling brass  
does charm.

O! what is it Musick cannot do,  
Sith th'al inspiring spirits it conquers  
too?

And makes the same down the Em-  
pyreal Pole

Descend to earth into a Prophets  
soul.

*Baptista Porta* doth ascribe the won-  
derfull effects of Musick to the several  
sorts of trees that the instruments are  
made of, whether the Vine or the Elder,  
the Poplar, Laurel, or the like; which  
(saith he) have a secret property to cure  
diseases, more then the sounds that are  
made by them: but he is mistaken here-  
in; for we know what power inartificial  
sounds and bare words (without Musick  
added) have over mens mindes and spi-  
rits

rits. *Scaliger* argues the case thus: The  
Vibration or trembling of the air (cau-  
sed by vocal or instrumental Musick)  
doth move and affect the spirits in mans  
body, which are subtile vapours of the  
blood and the instruments of the soul in  
all her operations; which spirits affect  
the soul as well as body, so that apt  
concordant sounds, carried in the curled  
air to the inward spirits, cause there a  
titillation or pleasure, and sometimes o-  
ther affections or passions according to  
the streins of the Musick, and according  
to the complexion of the hearer.

The Ancient Sages (as *Aristotle* re-  
ports) affirmed the Soul it self to be  
Harmony or harmoniously composed;  
so that there is a sort of affinity between  
it and Musick, and every man is natural-  
ly delighted therewith; so he in the 8<sup>th</sup>  
of his *Politicks*. *Macrobius* cometh very  
near to this of the Philosopher; *Fure*  
*capitur Musica omne quod vivit* (saith he)  
*ut cœlestis Anima, quâ animatur uni-*  
*versitas, originem sumpsit ex Musica.*  
That it is no wonder that every creature  
that hath a living soul is taken with Mu-  
sick, since the soul of the *Universe* (where-  
of

of every particular soul is a part or parcel) is made of Harmony.

Pericles *liberis Athenarum cervicibus jugum imposuit Eloquentia*; he held captive the free born Athenians by his Eloquence: *Eamq; urbem egit & versavit arbitrio suo*; steered and winded that people which way he listed himself. *V. Max. l. 8. c. 9.*

Hegesias a Philosopher of the Cyrenaic sect did so pathetically set forth the evils and discommodities of this life, that divers of his Auditors did take a resolution to make themselves away; so that the Philosopher was commanded by King Ptolomy to spend his Eloquence upon some other subject. *Cic. Tuscul. Quest. lib. 1.*

## CAP. IX.

## ΥΑΛΟΥΡΓΙΚΗ:

## Touching the Invention of Glass and Glass-works.

Glass is made of bright shining sand, and the ashes of a weed called *CaZal* — *Calices vili de pulvere na-* and *Zubit*, and the Ferne called by the *ti. Mart.* Arabians *Kali Alkali*, that is Glass-wort.

The invention was casual, and hinted thus, Certain glebes or large pieces of Nitre being brought out of a ship upon the shore, and taking fire by accident, melted the sand round about, so that it ran in a liquid transparent stream, as *Pliny* relates *l. 36. Nat. Hist.* and *Josephus* *l. 1. de bello Judaico*; and the Sidonians were the first that took the hint or document therefrom; *Sidon artifex vitri, Plin. l. 5.* This noble liquor (as *Pliny* calls it) is so obsequious and pliant (while it is

hot) that it may be spun into thred, and wrought into any form that a man can fancy; nay Art doth here imitate the Creation; for as God made creatures by the breath of his mouth, so the Artift makes glafs with a breath, and blows it into what shape and figure he pleaseth. *Vitrarius suo spiritu vitrum in habitus plurimos format, qui vix diligenti manu offingerentur*, as a contemplative Philosopher observed of old touching this business, *Sen. Epist. 90.*

When it is cooled, it will not yeild to the point of any Iron or Steel, but only the Diamond; and the restless Quick-silver, that which pierces through Iron, gold, and brass, will not pierce through this. Cups and Vessels made of glasse are very neat, clean, and wholesome. For they do not impart any ill tast or tincture to any liquor that is contained in them.

And they were (no doubt) as precious at first in this Hemisphere of the world as now they are in some parts of the Indies; for in the Kingdom of *Tydor* and other places, they exchange gold for glasse, as *Pigafetta* and sundry others do relate; so much are they taken with the aery brightness and transparency of

them

them: Moreover glasse doth not wear with the using: It admits no poyson, but betrays it by breaking; any excessive cold or heat breaks it, especially if it be fine, like that of *Venice*; so Chrystal is impatient of heats, as *Pliny* tells us, and *Martial* the Epigrammist in an Epigram we quoted before,

*Non sumus audacis Plebeia \* torcumata vitri*

*Nostra nec ardenti flamma feritur aqua.*

\* Torcumata.]

This word shews that glasse were

sometimes wrought upon the Turn, or the Turners wheel, as earthen vessels are; the word comes from *τεῖρω τέροω*, to turn; And *Pliny* doth expressly teach, that glasse was wrought either by blowing of it, or by being Turned, or by being engraven like silver, l. 36. *Nat. Hist.*

The best of this kinde are made at the *Murano*, a place within 2 miles of *Venice*, so that the Venice glasse do bear the bell from all others: Here to make their glasse so clear and transparent, and so like Chrystal, they dip it (while it is hot) in clean water, whereby it is clarified, and made like the water it self, wherein it is so tincted and seasoned. Though the glasse we now use be brittle ware, and easily shattered in pieces, yet there was an Artift in *Rome* in the Emperour *Tiberius* his time, that had found a way to make glasse malleable and yeilding, and such as

would bow rather then break; for the man bringing a glass-phial for a present to the Emperour to shew his art, he threw the Vessel against the stone pavement, with which blow it was not broken, but dented; then taking his hammer he beat in the dent again, to the no small wonder of the spectators, as *Dion* relates in the 56<sup>th</sup> of his History, and *Suetonius*, with others. The man was secretly made away, and so the Art was suppress'd, lest gold should be discountenanc'd and become vile, as the same *Suetonius* adds in the life of that Emperour.

*Ocularia.*

The use of glass is various and manifold, not only for making cups & vessels, but also for Looking-glasses, Telescopes, Microscopes, Thermometers, Sphears, Spectacles, or Lunulets, as the French, and *Bis-oculi*, as my Lord of S<sup>r</sup> Albans calls them; by the help of glasses, weak eyes are strengthned, & old eyes become young and vigorous; small objects are magnified and represented much bigger, things invisible are made visible, & things that are behinde us, brought before us: Yea, what things are done in our neighbours houses, and in our enemies tents, are brought to our knowledge without any

any *Mephistophilus* or Magick Art. See *Baptista Porta* his third book of his Natural Magick.

*Cornelius van Dreble*, a Citizen of *Alcmar* in *Holland*, and a rare Engineer, who lived in King *James* his Court here in *England* (as we mentioned before) invented the *Vitra Microscopia*, the Microscopes or glasses whereby we plainly see and discover the subtlest objects and the smallest, as the distinct colours and members of Flies and Worms and Nits, and the spots and small grains in Gemms, as also in Urine or Blood, which the eye could not otherwise discern. With these the *Anatomists* (in dissecting of bodies) discover the smallest veins and strings and fibres in the body of man or beast. There are Glasses called *Thermosci* and Thermometers, which being placed in a mans chamber, will discover the disposition and temper of the air, whether it be hot or cold, moist or dry, or inclining to either, invented by one *Sanctorius*, a Physician in *Padua*.

There are also Glasses called *Telescopes*, from their use in discovering things afarr off. invented first by *Jacobus Metius* of *Alcmar*, as *Des Cartes* tells me,

mee, and perfected (since) by *Gallileo Galilei* the Florentine, whereby they have discovered many new stars in the firmament, which no mortal eyes had noted before, which will represent objects thirty times bigger than their apparent quantity, and a hundred times nearer than their apparent distance. By these men have discovered not only new stars, but also *new worlds* in the stars, brought the moon before them to be better surveyed and perused, which they finde to be another *America*, full of pleasant rivers, hills and dales, and also well inhabited with people (such as they are) viz. *Lunatick people*. One *Telesius* a *Dane* hath (of late) given us a *Selenographia* or description of the Countries and Provinces there, with their several maps. *Cornelius Drebbel* before-mentioned had a little glass (but of a hands breadth in Diameter) which he called *Fabius Opticus*, wherewith he could distinctly see all the hills and spacious plains in the *Lunary world*, as also all the forrests, cities and buildings there, as *D<sup>r</sup> Gassendi* relates it in *l. 5.* written of the life of *Peyresc*.

There are Burning-glasses, wherewith (like *Prometheus*) we fetch fire from heaven;

ven; to wit, that celestial coal the Sun, by gathering his fiery beams into some narrow compass, and uniting them to that strength, that they can set any combustible stuff on fire: With such glasses *Archimedes* fired the Roman ships in the Harbour of *Syracuse*, *Marcellus* being General, as *Plutarch* reports in the life of *Marcellus*. With the like glasses *Proclus* (after him) defended *Constantinople*, by firing the ships of *Vitalianus*, who was beleaguering the town by sea, as *Zonaras* hath recorded in the life of *Anastasius Dicorus*. *Roger Bacon* our Countrey-man, a \* great Scholar and an acure man, told the Pope, That if he would be at the charge of making certain Burning-glasses after his direction, he would annoy the Turks more than all the Gallies of *Italy*, or an Army of an hundred thousand men could do, as *Gaffarellus* and others relate.

*Kircher*, a great Scholar (now living in *Rome*) confesseth that he hath busied his head very much about those glasses of *Archimedes* and *Proclus*, and about making the like, but he could never hit upon the experiment; and he saith, that he never saw or heard of any glasses (of late)

\* Vir tam  
vastæ do-  
ctrinæ, ut  
Anglia,  
imo orbis,  
ca re nihil  
haberet si-  
mile aut  
secundum  
Vols. de  
artibus po-  
pulariis  
magna, l. 10

late) that would burn above 15 paces distance. But *Baptista Porta* professes a way how to make glasses that would burn and fire things at any distance. And *Fohn Dee*, an eminent Mathematician of this Nation, doth profess (in a preface to a book of his called *Monas Hieroglyphica*) the Art to make a Glass that should calcine stones and reduce them to impalpable dust: these are *magnalia Artis*. But these things have been yet but in speculation for ought I finde; not but that very strange and wonderfull things might be done in this kinde and many other waies, if there were any encouragement for Artists, or if any would go to the expence of proving some usefull experiments, that are projected and thought feasible by ingenious and rational heads for the publick benefit.

*Archimedes*, that rare wit of *Syracuse*, made a Sphear of Glass, which did represent the perfect order and motions of the Heavenly bodies, which (besides many others) *Claudian* makes mention and describes in one of his Epigrams, which is set down before in the 7<sup>th</sup> Chapter.

de Magnete,  
lib. 1. c. 10.

But *Athanasius Kircher*. (whom wee often mentioned) doth affirm, That the Sphear

Sphear was not all of Glass, but onely the outside of it, that men might the better discern the wheels and motions within; yet *Petrus Ramus* tells us, that he saw at *Paris* two Sphears of Glass like those of *Archimedes*; one brought from the *Sicilian*, the other from the *German* spoils.

*Marcus Scaurus* made an Amphitheater of Glass, as *Pliny* relates in the 36<sup>th</sup> book cap. 15. But I finde by others that the Pavement was of Marble, and but the middle scene or story of Glass; which Glass was not our common Glass, neither (as I suppose) but rather *Obsidian* glass, which the same *Pliny* mentions elsewhere, and is found (or rather was found, for we hear of none now) in *Ethiopia*, which is very black like jet, and transparent as glass, friable and easy to be wrought with the cheescel; of which sort of glass was the stately Tomb which *Ptolomy* King of *Egypt* built at *Alexandria* for a Monument of *Alexander* the Great, as *Strabo* relates: And *Herodotus* also tells us, that this natural fossil-glass called *Obsidian*, was wont to be wrought hollow, and placed about dead bodies, as a Case through which

l. 17. Geogr.



which they might be seen of the beholders. The Specular stone was of this kinde, but that it was brighter and liker to Crystal.

It was (anciently) used for windowes (as *Martial* shews) to keep out cold.

*Hibernis objecta notis specularia puras*

*Admittunt soles, & sine face Diem.*

It was also used for a defence to some choice fruits, that they might not be nipt in the bud with the cold frosts and Northern windes; but this kinde of Stone is not now extant; *Guido Pancirollus* returns it *inter non inventa*. Tit. 6.

*Leander* in his description of *Italy* makes mention of a compleat Galley of Glass that he had seen at *Venice*, and also a pair of Organs of Glass; to wit, of fusile or common ordinary Glass. Mr *James Howell* saw such a Galley at the *Murano* of late times, as he informs us in his *History of Venice*.

As Glass is diaphanous, and permits a free passage of *species* through its body, as freely as air or water doth, so it is also reflexive, and beats back the said *species* that fall upon it; if the back side of it be lined with Tinn-foil,

foil, that is, the leaf of Tinn; Silver, or or other metal; and thus Looking-glasses are made, whereof there is manifold use, besides what Ladies use them for: for with such kinde of Glasses many strange feats may be performed, so strange, that it hath betrayed some men to a suspicion of *Magick* and unlawfull Arts, who have used to shew some representations and apparitions, either in the air or otherwise, when ignorant people did not understand the Contrivances or art of them.

CAP.

C A P. X.  
N A Y T I K H:

O R,

*The Invention of Shipping  
and Sailing ; as also of  
the Mariners Compass.*

SAYling was an Invention no less use-  
full than bold ; the Sea is a rough  
and dangerous Element, yet men have  
taken the boldness to set their foot upon  
the back of it, and ride upon the surging  
billows with a wooden horse : *Equo lig-  
neo vehuntur per vias caruleas*, saith the  
Comical *Plautus*. How farr will Art  
(joyned with courage) carry a man :  
*Illi robur & as triplex circapectus erat*,  
&c. That man (saith *Horace*) had a heart  
of oak and a breast lined with brass, that  
did first adventure to confront the winds  
and waves in a small tottering bark, when

at every step he goes, he treads upon his  
grave.

*Et prope tam lethum quàm prope  
cernit aquam.*

Which the Author of the book of  
*Wisdom* hath expressed thus.

*Verily, desire of gain hath devised ship-  
ping, and the workman built it by his skill.*

*But thy Providence, O Father, governs  
it, for thou hast made a way in the sea and a  
safe path in the waves.*

*Shewing that thou canst save from all  
dangers, yea though a man went to sea with-  
out Art.*

*Nevertheless, thou wouldst not that the  
works of thy wisdom should be idle ; and  
therefore do men commit their lives to a  
small piece of wood, and passing the rough  
Sea in a weak vessel, are saved. Wisd. 14.  
2, 3, 4, 5.*

We shall admire their boldness the  
more, if we consider what Implements  
they had in the first ages to sail in, and  
some people at this time. The *Egyptians*  
used to make boats of Reeds and Bull-  
rushes, saith *Pliny*, l. 13. *Nat. Hist.* and  
*Lucan*. l. 4. *Phar.*

— *Sic cùm tenet omnia Nilus*

M Conseritur

*Conseritur bibula Memphitica cymba  
papyro.*

Which kinde of boat or basket Moses was put to swim in, when Pharaoh's daughter took him up. The Prophet Esay makes mention of such Utensils, in that Periphrasis of Egypt; *Wo to the land shadowing with wings, that sends Embassadors by sea in Bulrushes, Isa. 18. 12. Papyraceis navibus armamentisq; Nili navigantus, Plin. Nat. Hist.* The Indians had the like boats, *Indorum rates Scirpeæ, atq; etiam vestes, Herodot. l. 1.*

The Britains of Old had their *Naves Vitiles*, as Pliny calls them; the Irish and the Natives call them *Corraghes*, & some *Corracles*; they were little Vessels of wicker, covered w<sup>th</sup> leather, & not much bigger than a basket, with which they would as proudly bestride the seas as Jason with his *Argo*. Lucan mentions and describes them thus, l. 4.

*Primum cava salix, madefacto vimine,  
ne, parvam*

*Texitur in puppim, cæsoq; induta  
Juvenco*

*Vectoris patiens tumidum superenatat  
Amnem:*

*Sic Venetus stagnante Pado, fusosq;  
Britannus*

*Navigat Oceano: sic cum tenet omnia  
Nilus*

*Conseritur bibula Memphitica cymba  
papyro.*

— Of twiggs and willow bo'rd,  
They made small boats, covered w<sup>th</sup>  
bullocks hide,  
In which they reacht the Rivers farther side.

So sail the *Veneti*, if *Padus* flow:

The *Brittains* sail on their calm Ocean so:

Mr May;

So the *Egyptians* sail with wooven boats

\* Of papyry rushes, in their *Nilus* floats.

\* These kinde of Baskets or Boats described by Lucan, were

ed by Julius Caesar, to transport his army over the river Sicoris against Petreius, and other rivers elsewhere; and he had learnt the making of them (as it seems) from the Britains, when hee was on this Island, as himself confesseth in his first book *de Bello civili*; Cujus generis, cum superioribus usus Britannia docuerat: and he describes them thus: *carinae primum ac statumina ex levis materia fiebant, reliquum corpus navium viminibus contextum, et ita integebatur. Loco citato.*

They have the like Vessels on the river  
*Euphrates* to carry commodities to *Ba-*

*bylon*, and so like to these *Brittish* ones, that (according to *Herodotus* his description of them ) a man would think that either the *Brittains* borrowed the pattern from the *Babylonians*, or the *Babylonians* from them : For *Herodotus* in *Clio*, that is, the first book of his History, saith, that they had boats made of *Osier* or *Willows* of an orbicular for, in fashion of a Buckler, without prow or poop, and covered over on the outside with the hide of a bullock tann'd : In these, besides other Countrey-commodities, they used to carry Palm-wines (in tonns) to be sold at *Babylon* ; two men with an oar a picce in their hands guiding the Vessel.

These Vessels were so light, that the owners used to carry them upon their backs to and from the water ; the Master would carry his boat by land and the boat would carry it's Master on the water : As the *Arabian* Fisher-man useth to do with his Tortoise shell, which is his shallop by sea and his house on the firm land, under which he sleeps ; which we have expressed in this Latine Epigram.

Hæc

*Hæc ratis atque domus ; nostra en  
compendia vite !*

*Hæc habitat sollers, hæc mare sul-  
cat Arabs.*

*Se tegit hæc terris, hæc victum querit  
in undis :*

*Ipsa domus dominum portat, &  
ipse domum.*

This I found expressed (afterwards) by the excellent *du-Bartas*, and his no less excellent interpreter *Sylvester*, thus :

The *Tyrian* Merchant or the *Por-  
tugez*

Can build one ship of many trees ;  
But of one Tortoise when he list to  
float,

The *Arabian* Fisher-man can make a  
boat.

And one such shell him in the stead  
doth stand,

Of Hulk at sea, and of a House  
by land.

such like these are those which the *E-  
gyptians* use (at this day) upon the *Nile*,  
M 3 which

which they took upon their backs when they came to the Cataracts and steep falls of that River.

*De politia  
illustrium,  
lib. 4.*

*Boterus* calls them *Naves Plicatiles*, and which they use in some places of the West-Indies. For in the year 1509, we read that there were brought to Roan seven Indians in one small vessel or boat, which was so light that one man could lift it up with his hand, as the same *Boterus* relates.

In some places of the West-Indies they fish with Fagots made of Bulrushes, which they call *Balsas*; having carried them upon their shoulders to the sea, they cast them in, and then leap upon them, & then row into the main sea with small reeds on either side, themselves standing upright like *Tritons* or *Neptunes*; and on these *Balsas* they carry their cords and nets to fish with. *Joseph. Acosta*, l. 3. c. 15.

*Strabo* sailed to Egypt in a small thing like a Basket made of wicker, as himself relates in the seventeenth of his Geography. The Indians have long boats called *Canoas*, neatly made up of one tree made hollow. In Greenland the Fishermens boats are made like Weave shuttles, covered outwardly with skin

of *Seals*, and fashioned and strengthened with the bones of the same fishes; which being sewed together with many doubles, are so strong, that in foul weather they will shut themselves up in the same secure from the rocks, wind and weather. *Purchas* l. 8. of *America*. These are about 20 foot long, and 2 foot and a half broad, and so swift that no ship is able to keep way with them; and so light, that one man may carry many, and they carry but one oar.

I saw a ship (saith a learned man, and one that spent 40 years in travels, and the onely man that I read of that outstript *Sr John Mandevill*, who travelled but 33 years (as *Baleus* delivers) laden with *Arabian* Merchandize, which was made up without Iron, but the plancks and ribs weres sewed with cords, and the futures covered with sweet smelling *Rosine*, which came from the *Franckincense* tree. The tacklings, sails, and every part of the ship was made of one tree, which bears the Indian Nut. So *Petrus Gellius* in his description of the *Thracian Bosphorus*.

—The Indian Nut alone  
Is clothing, meat and trencher,  
drink and kan,  
Boat, cable, sail, and needle all in  
one.

So that pious and Seraphic Poet Mr  
George Herbert.

At first, one small tree did serve to  
make a boat, being made hollow: After  
this, men stiched large plancks and  
boards together with Prows and Poops,  
fit to plow up the *liquid* plains; then they  
added Masts and Sails, and gathered the  
winde in a sheet, for to drive those Hulks  
on their way. The *Tyrians*, who were fa-  
mous Navigators of old, are said to be  
the first that made such kinde of Ves-  
sels.

*Utque maris vastum prospectet  
turribus æquor,  
Prima ratem ventis credere do-  
cta Tyros.*

Ovid tells us, that *Jason* King of *Thes-  
saly* was the first contriver of ships;

—*primæq; ratis molitor Iason.*  
And that his ships name was *Argo*, where-  
with

with he fetcht the Golden Fleece from  
*Colchos*, and which the Astronomers  
afterwards have stellified or fixed as a  
Constellation in heaven.

*Vellera cum Minyis nitido radiantia  
villo,  
Per mare non notum primâ petiere  
carinâ. Ovid. Metam. l. 6.*

*Lucan* confirms the same, l. 3.

*Inde laceßitum primò mare, cum rudis  
Argo  
Miscuit ignotas temerato listore  
gentes.*

The Fish called *Nautilus*, or the  
Little Mariner, was *Navigiorum Arche-  
typus*, the first type or pattern of a Ship;  
for when he is to swim, he composeth  
his body and finns into the form of a  
Galley under sail: from the sight where-  
of, some (as *Pliny* conceives) took the  
first hint of framing a Ship. As from  
the sight of a Kite flying in the air and  
turning and steering himself with his  
tayl (as fishes do in the water) some have  
devised the stern of a ship, *Natura mon-  
strante in cælo, quod esset opus in pro-  
fundo*, as *Pliny* l. 10. and *Seneca* also  
*Epist.*

*Epist. 91: Nulla ars intra initium suum steterit: As there is no art but receives addition and perfection by degrees, so hath this: Caligula made a stately Galley of Cedar, with spacious Halls, and costly rooms therein, with gardens also and trees (fresh and green) upon the Decks, like the Pensill gardens of Semiramis; so that it seemed a floating garden, as well as a floating Castle. But Ptolomæus Philopater outstript him far, who built a Ship (saith my Author) that the like was never seen before or since; It was two hundred eighty cubits in length, fifty two cubits in height from the bottome to the upper Decks; it had four hundred banks or seats of Rowers, four hundred Mariners, and four thousand Rowers, and on the Decks it could contain three thousand souldiers; there were also Gardens and Orchards on the top of it, as Plutarch relates in the life of Demetrius.*

Thus what was invented at first for necessity, is now improved to Ryot and Luxury.

The Ancients had a way to drive their ships without Oar or Sayl, so that they could never be wind-bound; they had in their ships three wheels on each side, with

*suet. in Vita.*

*Panciro. de rebus nuper inventis, tit. 38.*

*Vitruv.*

eight radii of a span long jetting out from every wheel; six Oxen within did turn this Machin and wheels, which casting the water backward, did move the ship with incredible speed and force; they had in these ships an instrument called *Gar-rum*, which went with wheels in fashion of a Dyal, which at the end of every hour did let fall a stone into a Bason, and so divided the hours of the day.

There have been Boats made here in England to go under water, which my Lord of St Albans seems to touch, *Audimus inventam esse Machinam aliquam Naviculæ aut Scaphæ, quæ subter aquis vehere possit ad spatia nonnulla: We are not now content to sail upon the waters, but we must sail under them too.*

*No. Organum, l. 2.*

I know not whether *Iulius Scaliger* was a braggard or no, but he doth confidently aver, that he could make a ship that could steer her self as easily as kiss his hand (as we say) *Naviculam sponte sua mobilem ac sui remigii authorem faciam nullo negotio; and to frame a flying Dove like that of Archytas vel facillimè profiteri audeo, saith the same great Scholar, Exer. 326.*

In a *Naumachia* or representation of a Naval

(156)

Naval fight in the time of *Claudius Caesar*, a Triton (or Sea god) sprung up in the midst of the Lake, sounding aloud with a silver Trumpet, *Suet. in vit. Claudii*. *Juvenal* makes mention of earthen boats to sail with, used also in *Aegypt*; for speaking of the deadly feud and fighting between the Towns of *Ombos* and *Tentyra* about their gods, he speaks thus, *Sat. 15*.

*Hac sevit rabie imbelles & inutile vul-  
gus  
Parvula fictilibus solitum dare vela  
Phaselis,  
Et brevibus picta remis incumbere  
testa.*

---

*An Appendix of the Mariners Card  
or Compass.*

**T**Hough these flying Coaches on Sea were brought to great perfection many years since, yet there was no small deficiency in the Art of Navigation before the use of the Compass was found

(157)

found out; which was invented first here in *Europe* by *Iohn Goia*, or *Flavius Goia*, as others call him, of the Town of *Amalphi* in *Campania*, in the Kingdom of *Naples*.

*Prima dedit Nautis usum Magnetis A-  
malphi:*

*Du Bartas* calls him *Flavio* in these words,

We are not to *Ceres* so much bound  
for bread,  
Neither to *Bacchus* for his clusters  
red;  
As Signior *Flavio* for thy witty tryal,  
For first inventing of the Seaman's  
Dyal.

Before this invention, Pilots were directed in their right voyages by certain stars which they took notice of, especially the *Pleiades*, or *Charles his Wain*, and the two stars in the tayl of the Bear, called *Helice* and *Cynosura*, which are therefore called *Lead-stars*, or leading stars; As Travellers in the Desarts of *Arabia* and those of *Tartary* were always guided by some



some fixed stars in the night time, to steer their courses in those pathless & uncouth ways, so Seamen were directed by the like heavenly guides, in the pathless wilderness of waters, before this excellent invention was found out.

*Sidera Cuncta notat tacito labentia Cælo.*

So *Virgil* speaks of *Palinurus*, who was Shipmaster or chief Pilot and Steersman to *Aeneas*; but if the sky chanced to be overcast, and the stars to be curtain'd with clouds, then the most experienced Mariner was at a loss, and must cast Anchor presently, and take up his rest.

Star: l. 1.  
Theb.

*Cum neq; Temo Piger, nec amico Sidere  
monstrat*

*Luna vias, medio cæli pelagique tu-  
multu*

*Stat rationis inops——*

But the ingenious *Amalphitan* hath devised a remedy against this grand inconvenience, and found a way that men might steer a certain and infallible course in the darkest nights, and this by the help of a little stone, called (from the use and benefit)

benefit) the Loadstone. This Loadstone is now our Load-star, and the Mariners *Directory*. This stone (for the universal benefit and use of it) is the wonder of all stones; as *Rablais* said, that a Millstone was the most precious stone of any other, so I may say, that a Loadstone is comparable to all the gems and precious stones in the world; it is but obscure and mean in sight, no sparkling lustre to be seen in it.

—— *Lapis est cognomine Magnes  
Decolor, obscurus, vilis, &c.*

*Glaud. de  
Magnete.*

*Si tamen hic nigri videas miracula saxi  
Tunc superat pulchros cultus, & quic-  
quid Eoi*

*Indus littoribus rubrâ scrutatur in  
Algâ*

This stone hath two strange properties, the one of *Attraction*, the other of *Direction*; this property of *Direction*, (which chiefly concerns our present business) is, that being set in a dish, and left to float freely upon the water, it will with one end point directly to the North, and with the other to the South, and will give this faculty or property to a needle that is rubb'd or touched with it.

From

From these two faculties of *Attraction* and *Direction*, many excellent, useful, and ingenious Inventions have bin found out, especially this *Pyxis Nautica*, or Mariners Card or Compass, which carries a needle touched with the Loadstone in the middle of it, with two and thirty Rumbs or lines drawn round about it; according to the number of the Cardinal and Collateral Winds. Now this animated needle shews with the Lilly-hand (or point) the North in any part of the world, which is a great help to the Pilot to direct him to what point of the Compass to steer his course.

This *Pyx* or Card is no less useful by Land then it is by Sea; so that they that travel through Desarts, as the *Carovans* do to *Mecha* and *Medina*, and other places, do now make good use of this device, whereas heretofore some star was their best guide by night.

*Pliny* speaks of the Inhabitants of *Ta-probana* (now called *Sumatra*) that because they do not see the *Pole-Star* to sayl by, they carry with them certain birds to sea, which they do often let fly; and as these birds by natural instinct fly always towards the land, so the Mariners direct their course after them.

In

In *Syria*, and some Countries of the East that are covered with sand, so that there is no tract or path to guide the Traveller, and those sands are also scorching hot, that they cannot be endured by day, they travel by night, and by the direction of certain stars, which they use as certain way-marks to steer their course by: As *Mor Isaac* in *Philosophia Syriaca*. So also in the Country of the *Bactrians*, as *Curtius* relates: *Navigantium modo Sidera observant, ad quorum cursum iter dirigunt, Curt. l. 7.*

*Lud. Bartema* relates, that they that travel over the Desarts of *Arabia*, which are all covered with light and fleeting sands, so that no track can ever be found, do make certain boxes of wood, which they place on Camels backs, and shutting themselves in the said boxes to keep them from the sands, and by the help of the Loadstone like the Mariners Compass, they steer their course over the vast and uncouth Desarts. Some do ascribe this invention to that ingenious people of *China*. Dr *Gilbert* affirms, that *Paulus Venetus* brought it first into *Italy* in the year 1260, having learn'd it from the *Chinois*, as he saith *l. 1. de Magnete, c. 2.*

N

and

and *Ludovicus Vertomanus*, another traveller, saith, that when he was in the East Indies about the year 1500 (above an hundred and fifty years since) he saw the Pilot of his ship direct his course by a Compass (framed after the same manner as we have now) when he was sayling towards *Java*.

The Mariners Compass is not brought yet to that perfection, but that it requires some rectification and amendment; for the Magnetique Needle doth not exactly point to the North in all Meridians. but varies and swerves (in some places more, in some less) from the Direct posture, Configuration, and Aspect of the North and South, which puts Seamen to much distraction, and makes them run oftentimes on dangerous errors. *Van Helmont* a great *Paracelsian* of *Germany*, professeth a ready way to rectifie this grand inconvenience, namely, how to make a Needle that should never vary or alter from the right point, which may be performed by a strong imagination, as he saith, thus; If a man in framing the Needle shall stand with his back to the North, and place one point of the Needle (which he intends for the North) directly towards himself,

himself, the Needle so made shall always point regularly and infallibly toward the North without variation. I wish that some *Fancy-full* man of an exalted imagination would make some Needles for experiment after *Helmont's* direction, since it is a business of great concernment to the publique Weal, to have this business rectified.

---

N 2

CAP.

## CAP. XI.

## HMEPΩTIKH:

OR,

*The Art of Cicuration and  
Taming wilde Beasts.*

**W**Hile I look back upon the title of the Book, which is *Historia Naturæ subactæ*, The History of Nature subdued and brought under the power of man; I conceive this ensuing Chapter will be no digression or seem impertinent, but will prove pertinent enough to the scope and design of the work. In this *Theater* of mans wit, it will not (a little) illustrate the power of it, if we bring wilde Beasts upon the stage, to shew that the most savage creatures have been managed by mans wit and made docile and tractable for all services and employments.

The Spirit of God hath spoke it ;  
That

*That every kinde of Beasts and of Birds, and of Serpents, and things in the sea is tamed and hath been tamed of mankinde, Jam 3.7. I shall verifie and confirm this position of the Apostle by Examples of several kindes.*

I. For BEASTS; *Aspice Elephantorum colla jugo submissa*, saith *Seneca*; behold the Elephant, w<sup>ch</sup> is the strongest and biggest beast in the Forrest, yet this hath been tamed and managed and made serviceable for all the offices both of Peace and Warr. It hath been taught to draw and carry; some ride him for the Warrs; some yoke him for the plough; & some make him to draw their Coach, as the Emperour *Gordian* had some to draw his, as *Fulius Capitolinus* reports of him. Many stories (that seem incredible) of the *Officiousness* and *Docileness* of this creature, you may reade amassed together (out of several Authors) by *Lipsius* in one of his Epistles *ad Germanos*.

The Lion himself, whom some term the King of Beasts, hath been (by the dexterity of mans wit) made tractable and officious for many Menial Offices. *Mark Anthony* had Lions to draw his  
N 3      Triumphal

Triumphal Chariot, as *Pliny* reports, *Primus Romæ Leones ad Currum junxit M. Antonius, non sine quodam ostento temporum, generosos spiritus jugum subire illo prodigio significante, Pl. l. 8. c. 16.* Hanno the Carthaginian had a Lion so tame and familiar, that he could either ride him or lead him with any carriage for to bring it to Market, as *Plin. lib. 8. Nat. Hist. cap. 16.* and *Maximus Tyrius serm. 32.* do relate. But this cost him a Banishment; for the jealous Carthaginians began to fear that he might soon put the reins in their mouths and ride them too, that had done so by a Lion. It is no Poetical fable (perhaps) that Tygers drew the Coach of *Bacchus*, which *Silius Italicus* makes mention of.

—odoratis descendens Liber ab Indis  
Egit Pampineos frenata Tygride  
Currus.

For that Monster *Heliogabalus* had Lions and Tygers (at once) to draw his Coach, as *Lampridius* relates in his life.

*Martial*, lib. 8. Epist. 26. mentions the same in *Domitians* time.

Vicit

Vicit Erythraeos tua (Cæsar) arena  
triumphos,  
Et victoris opes, divitiâsque  
Dei.

Nam cum Captivos ageret sub Cur-  
ribus Indos,  
Contentus geminâ Tygride  
Bacchus erat.

And that the fierce *Bysons* were taught to draw the Chariot; and also Stags at their publick shews, is affirmed by the same Poet. As I have seen in *England* by *Walton* upon *Thames* 4 Stags drawing a small Coach; and it is no poetical fiction that Stags drew the Coach of *Diana*, as *Claudian* the Poet sings of her.

—Frondosâ fertur ab Alpe  
Trans pelagus; Cervi currum subiere  
jugales.

*Fabricius Veiento*, when he was *Prætor* of *Rome*, brought into the *Cirque* a Chariot drawn by Dogs, as *Lipsius* tells me in his notes upon *Tacitus*: nay, *Estridges* have been taught to draw in a Coach by the Emperour *Firmus*, as *Textor* reports in his *Officina*.

The Count of *Stolberg* in *Germany*  
had

had a Deer which he bestowed on the Emperour *Maximilian* the Second, that would receive a rider on his back, and a bridle in his mouth, and would run a race with the fleetest horses that came in the field, and out-strip them too, as *Michael Neander* relates, *Physic. part. I. Martial, l. 13. Epigr. 26.* makes mention of a Deer used to the bridle.

*Hic erat ille tuo domitus, Cyparisse,  
capiſtro,  
An magis ille tuus, Sylvia, Cervus  
erat.*

Sir *Hierom Bowes* at his return from *Muscovia* (where he had been Embassador) brought over certain Does of admirable swiftness, of the nature of the *Rangifer*, which being yoked and coupled together in a Coach, would carry one man with great speed, as *Cambden* in the *Annals* of *Q. Elizabeth* relates, *part. 3.*

The King of *Cambaiia* hath tame Panthers, Lions & Leopards, which he useth as hunting dogs or Grey-hounds to hunt Deer and Wilde boars withall, as *Ælian* reports, *l. 17. variar. hist.* and *Scaliger, Excer. 189.* At *Prague*, in the King of *Bohemia's* Palace, Mr *Morison* saw two tame  
Leo-

Leopards that would (either of them) at a call leap behinde the Huntsman, when he went abroad a hunting, and sit like a Dog on the hinder part of the horse, and would soon dispatch a Hart.

These Examples shew forth the excellency of mans spirit, which (by a discreet managery) can reduce those creatures (that have revolted from their Homage to their natural liege Lord and Sovereign, Man) to their primitive obedience, which they did once voluntarily and freely pay unto him before the fall of *Adam*, and before the first man revolted (by sin) from his maker; and we may see hereby that saying of *Xenophon* verified, *παντὶ ζῳῷ πάσιον ἀρχεῖν ἢ ἀνθρώπῳ*, it is farre easier taming & managing any creature than man; and that of *Seneca*, *Est nullum animal homine morosius, aut majore arte tractandum*; there is no creature so wayward and fierce and untractable as man.

2. For *Serpents*, that have been tamed by man (as the Apostle mentions) wee may vouch *Strabo* for a tame Crocodile in *Egypt* in the Lake of *Myris*: and *Seneca* for a tame Dragon that took meat from the hand of *Tiberius*; he mentions  
else-

elsewhere, *repentes inter pocula sinuſq; innoxio lapſu Dracones*, l. 2. de *Ira*. Dragons that crept upon mens tables among their cups, and harmleſſy along their boſomes: and the four-legged Serpents in *Cairo* were tame and harmleſſ, that wee ſpake of before in the Chapter of *Muſick*.

3. For *Birds* and wilde Fowle, we may inſtance in the *Eſtridges*, that were put to draw a Coach; in *Eagles*, that are trained in *Turky* like Hawks to fly at any fowl; in the *Crow*, that *Scaliger* ſaw in the French Kings Court, that was taught to flye at Partridges, or any other fowl, from the Falconers fiſt; and laſtly, in *Wilde-Ducks*, that are tamed and made *Decoyes*, to intice and betray their fellows, which is commonly known.

4. Then fourthly, for things in the *Sea* that have been tamed, we may inſtance in a fiſh called the *Manati*, or *Sea-Cow*, well known about *Hiſpaniola* and other places of the *West-Indies*; it hath the form of a Cow, and hath four feet, and comes often to land to eat graſs: *Peter Martyr* in his *Decads* ſpeaks of an Indian Cacique or Lord of the Countrey that had one of theſe tame Cows, that

that would eat meat out of his hands, and was as ſportfull as an Ape, & would carry his ſons and ſervants (ſometimes ten of them at a time) on his back, and waſt them over a great Lake from one ſhore to another. We may inſtance alſo in the *Sea-Horſe* that hath been tamed, and made tractable to carry men on his back, as *Leo Afer* reports of one he had ſeen, in his *History of Africa*; and in the Fiſh called *Reverſus*, by whole help and admirable induſtry, the Indians uſed to catch Fiſh in the Sea, as *Bodin* relates in the third book of his *Theatrum Naturæ*: He is let looſe at the prey, as the Greyhound from the ſlip, as *Purchas* ſaith; and *Peter Martyr* hath the like ſtory of it in his *Decads*: *Pliny* ſpeaks the ſame of Dolphins, which he had ſeen (in ſome places) to be uſed for to catch Fiſh, and to bring them to ſhore, and upon receiving ſome part of the prey, to go their ways; and if they failed in ſome point of ſervice, they ſuffered themſelves patiently to be corrected, as *Setting-Dogs*, and *Qua-Ducks*, or *Decoy Ducks* (as we commonly call them) uſe to be. This ſame is affirmed of the Dolphins by *Oppianus* a learned Writer, in his *Haliæuticks*.

*Halienticks.* Otters have been tamed, and taught to drive Fish into the Net, as Dogs use to drive cattle into the Fold, as *Cardan* relates.

But this is not all, wilde beasts and birds have been tamed not only for the service, but also for the pleasure and pastime of man: As man hath learn'd some Arts from them, so they have learn'd some from man: Camels have been taught to dance, as the African *Leo* hath seen in his Country. Elephants have also been taught the same; and not only on the earth, but also in the air, *ambulare per funem*, to dance upon the Ropes: *Seneca* is my Author for it, *Epist.* 85. The manner of teaching them to dance is thus, They bring some young Elephant or Camel upon a floor of earth, that hath been heated underneath, and they play on a Cittern or Tabor, while the poor beast lifts up his stumps from the hot floor very often, more by reason of the heat then any lust to dance; and this they practise so often, until the beast hath got such a habit of it, that when ever he hears any Musique he falls a dancing. *Bubsequius* saw a dancing Elephant in *Constantinople*, and the same Elephant playing

Sands  
Travels.

playing at ball, tossing it to another man with his Trunk, and receiving it back again.

*Michael Neander* saw in *Germany* a bear brought from *Poland*, that would play upon the Tabor, and dance some measures, yea dance within the compass of a round Cap, which he would afterwards hold up in his paw to the Spectators, to receive money (or some other boon) for his pains. There was a dance of Horses presented at the marriage of the Duke of *Florence*, which *Sir Kenelm Digby* mentions. An Ass hath not so dull a soul as some suppose; for *Leo Afer* saw one in *Africa* that could vie feats with *Banckes* his Horse, that rare Master of the *Caballistick* Art, whose memory is not forgotten in *England*.

The *Sybarites* (a people of *Italy* being given to delicacies) had taught some Horses to dance; The *Crotonians* hearing thereof, and preparing War against them for some former quarrel, brought with them some Flutes and Flutists to the War, who had direction to pipe it as loud as they could, when the *Sybarites* were ready to charge with their Horse; whereupon the *Sybarites* Horses, instead of

Treatise of  
Bodies.



of rushing upon the Enemy, fell a dancing, and so gave the victory to the Enemies thereby, as three grave Authors have recorded, *Diod. Sic. l. 12. El. l. 16. c. 23. Plin. l. 8. c. 42.*

*Batrasar*

*Castilione de Aulico.*

A Baboon was seen to play upon the Guittar; and a Monky in the King of Spain's Court was very skilful at Chess-play. Some birds have been taught to speak mans language, and to utter whole sentences of Greck and Latine articulately; There were seen in Rome Stares, Pycs, and Crows, that could do this to the admiration of all men. Cardinal *Ascanio* had a Parror, that could repeat the Apostles Creed *verbatim* in Latine; and in the Court of Spain there was one that could sing the *Gamut* perfectly; and if he was out, he would say, *No va bueno*, That is not well; but when he was right he would say, *Bueno va*, Now it is well; as *John Barnes* an English Frier relates in a most learned Book of his, *De Aequivocatione*. What witty feats and tricks Dogs have been taught to do, are so well known, that I may spare instances of this kind. Many of these examples that I have produced to make good the Title of this Chapter, and the Apostles saying above-

above-mentioned, are briefly sum'd up by *Martial* in his Book of Shows, the 105<sup>th</sup> *Epigr.* which I have here annexed, with the Translation of *M. Hen. Vaughan Silurist*, whose excellent Poems are publique.

*Pictò quod juga delicata collo  
Pardus sustinet, improbaq; Tygres  
Indulgent patientiam flagello,  
Mordent aurea quod lupata Cervi;  
Quod Frœnis Lybici domantur Ursti,  
Et quantum Caledon tulisse fertur  
Paret purpureis Aper Capistris.  
Turpes<sup>a</sup> esseda quod trahunt Bifontes<sup>b</sup>  
Et molles dare jussa quod choreas:  
Nigro<sup>c</sup> Bellua<sup>d</sup> nil negat Magistro,  
Quis spectacula non putet Decorum?  
Hæc transi tamen ut minora, quisquis  
Venatus humiles videt Leonum, &c.*

That the fierce Pard doth at a beck  
Yield to the Yoke his spotted neck,  
And the untoward Tyger bear  
The whip with a submissive fear;  
That Stags do foam with golden  
bits

And the rough Lybic bear submits  
Unto the Ring; that a wild Boar

Like

<sup>a</sup> Brittil  
<sup>b</sup> Chariots  
<sup>c</sup> Wild  
Oxen in  
the Herc  
nian Fo  
rest called  
Buffles.  
<sup>d</sup> The N  
gro or  
Black-  
Moor, tha  
rides him  
d The  
Elephant.

( 176 )

Like that which *Caledon* of Yore  
Brought forth, doth mildly put his  
head

In purple Muzzles to be lead:  
That the vast strong-limb'd Buffles  
draw

The *Brittish* Chariots with taught  
awe.

And the Elephant with Courtship  
falls

To any dance the *Negro* calls:  
VVould not you think such sports as  
those,

VVere shews which the Gods did ex-  
pose;

But these are nothing, when we see  
That Hares by Lions hunted be, &c.

Elephants (which are the most docile  
creatures of all others, and come nearest  
in sense to man) are taught to understand  
the language of the Countrey, and to  
perform all duties by the sole command  
of their riders. Horses and Mules un-  
derstand Carters language, who with  
their terms of Art, as *Gee* and *Ree*, and  
the like, will make them go or stop, turn  
on the right hand or on the left, as they  
please. *Clandian* observed this pretty  
disci

( 177 )

discipline in French Mules, which he  
thought worthy of a cast of his pen.

*Aspice morigeras Rhodani Torrentis  
alumnas*

*Imperio nexas, imperioque vagas,  
Dissona quam varios flectant ad mur-  
mura cursus,*

*Et Certas adeant voce regente vias.  
Absentis longinqua valent præcepta  
magistri*

*Frænorumque vices lingua virilis  
agit.*

Mark how the docile Mules of *Rhone*  
now close

And forward draw, now wheelingly  
and loose;

What various courses at the Carters  
voyce

They shape, and still tread new com-  
manded ways;

Their distant drivers notes each one  
observes,

And his loud tongue for bit and bridle  
serves.

In *France* and *Italy* where they plow  
with Horses, one man serves to hold the  
O Plough

plough, and drive the horses too : Dogs have been trained up for the Wars by the ancient Brittons and Gauls, as Strabo and Camden relate; so have Bulls, and Boars, and Lyons, as apptars by Lucret. lib. 5.

*Tentarunt etiam Tauras in mœnere belli,  
Expertiq; suos sevos sunt mittere in hostes.  
Et validos Parthi præ se misere Leones  
Cum Duكتورibus armatis, sævisq; Magistris  
Qui moderatier hos possent, vinculisque tenere.*

Which instances have verified that Embleme and Motto of one of the German Emperours, which was, a Lion in a chain with this word, *Ars vincit Naturam*: and that of the Greek Poet,

Τεχνῇ κερταῖναι, ὧν φύσει νικώμεθα.

*Naturâ ubi superamur, arte vincimus.*

And this of another cited by Grotius in his Annotations on his excellent Tract *de Veritate Religionis*.

Βεγ

Βεγχοῖ τοι δὲν ἀνέρε  
Ἄλλα ποικιλιά παρὰ πίδων  
Δαμά φυλά πόντι  
Χθονίων τε αἰθερίων τε παρὰ δὲ μαλα.

*Vis exigua est, quamcunq; homini  
Nature dedisti: sed consilium  
Varie artes qua nata mari,  
Et qua terrâ, aereque domant.*

*Una ratio omnes omnium animantium vires potestate in se continet. Plut. de Fort. Romanorum.*

*A summo opifice cuncta animalia serva facta sunt animanti ratione utenti. Orig. contra Celsum, l. 4.*

O 2

CAP.

## CAP. XII.

## TE XNO-ΠΑΙΓΝΙΑ :

O R,

*Certain Sports and Extravagancies of Art.*

**A**S Nature hath her *ludicra*, so Art hath hers too ; that is, some pretty *knacks* that are made, not so much for use, as to shew subtilty of Wit, being made *de Gaiete de Ceur*, and for pastime as it were ; yet the workmanship and elegance of these may justly deserve admiration ; and I may say of them as *Virgil* said of his Poem concerning Bees, *In tenui labor est, at tenuis non gloria* : and we may further say of Artificial things, as *Cardan* spake of Natural things, *Non minori miraculo in parvis ludit Natura (ludit Ars) quam in magnis* : Art (as well as Nature) is never more wonderful then in smaller pieces.

l. 4. C. cor.  
l. 8. de  
Var. c. 43.

Saint

Saint *Augustine* saith, That he did not know whether to wonder at more, the tooth of an Elephant, or that of a *Teredo* or Moth, which eats not only cloth, but consumes posts and pillars, whose tooth is so far from being seen, that the whole body of it is scarce visible. Some examples and instances of this kind, which I have casually lighted upon in tumbling over books, I have thought fit to annex to this former Rapsody.

*Admiranda tibi levium spectacula rerum*

*Exhibeo*

One *Calliocrates* a Stone cutter of *Sparta*, made Ants of Ivory, with all their limbs, so small, that the eye could scarce discern them. *Myrmecides* the *Milesian* made a Chariot of Ivory, with Horses and Charioteer in so small a compass, that a Fly could cover them with her wings ; He made also a ship with all her tacklings, that a Bee could hide it, *Pl. l. 7. c. 21. & l. 36. c. 5. And Aelian l. 1. var. hist. c. 52.* are my Authors,

*Ovid* speaks of the admirable chains & nets which *Vulcan* made to apprehend

O 3

Mars

Mars in conjunction with his Venus,  
which were so fine and subtle,

— *Quæ fallere lumina possent,*

That the wanton Lovers could not see  
them till they felt them : Ovid describes  
them thus, l. 4. *Metam.*

— *Exempla graciles ex ære Catenas,  
Retiaque & laqueos, quæ fallere lumina  
possent,*

*Elimat, non illud opus tenuissima vin-  
cant*

*Stamina, nec summo quæ pendet aranea  
Tigno :*

*Utque leves tactus, momentaque parva  
sequantur,*

*Efficit, & lecto circumdata collocat aptè.*

A VVaggon and Oxen made of glass  
that might be hidden under a Fly, are  
mentioned by Cardan, l. 10. var. c. 52.

Leander Alberti in his description of  
Italy, makes mention of a Lock very  
neatly and artificially made of VWood,  
without any Iron in it.

But one Mark Scalio a Black smith and  
Citizen of London, for proof of his skill  
and

and workmanship, made one hanging  
lock of Iron, Steel and Brass, of eleven  
several pieces, and a pipe key, all clean  
wrought, which weighed but one grain  
of gold, which is but one wheat corn.  
He also made at the same time a chain of  
gold of 43 links, to which chain the lock  
and key being fastened and put about a  
fleas neck; she drew the same with ease:  
all which lock and key, chain and flea  
weighed but one grain and a half: A  
thing most incredible to believe, but that  
I my self have seen it, saith M. John Stow,  
in the *Annals of Q. Elizabeth.*

Scaliger makes mention of a flea that he *Exerc. 136.*  
had seen with a gold chain about her neck  
and kept daintily in a box; which for her  
food did suck her mistresses white hand.  
Leo Afer saw the like flea and chain in  
Memphis or Grand Cairo, and the Artifi- *J. 8. Hist. Afric.*  
cer that made the chain had a suit of cloth  
of gold bestowed upon him by the Sol-  
dan after the manner of that Country.

Hadr. Junius saw at Mech'in in Bra-  
bant, a cherry stone cut in the form of a  
basket, wherein were fourteen pair of dice  
distinct, each with their spots and number  
easily to be discerned with a good eye. l.  
*6. Animadvers.*

Galen

*Galen* makes mention of a pretious stone enchased in a ring, wherein was the picture of *Phaeton*, most accurately cut, driving the chariot of the Sun, and being not able to rule his fiery Steeds, tumbling headlong into the River *Eridanus* (or the *Poe*) The world being all set on a flame, according to *Ovid*'s description, l. 2. *Metam.*

*George Whitehead* whom we mentioned before, made a Ship with all her tacklings to move of its self on a table; with rowers plying the Oars, a woman playing on the Lute, and a little whelp crying on the deck. *Schottus in Itinera Italiae.*

*Gasserellus* a Frenchman makes mention of a clock that he had seen at *Legorn*, made by a German (for these Germans are said to have their wits at their fingers ends) on which clock a company of shepherds playd upon the bagpipes, with rare harmony and motion of the fingers, while others danced by couples, keeping time and measure, and some others capered and leaped. *Cap. 6. of Unheard of Curiosities.*

*Cardan* speaks of an Artizan at *Lions*, that made a chain of Glass that was so light and slender that if it fell upon a stone pavement,

pavement, it would not break, *Card. l. 10. Var. c. 52.*

Amongst these *ματαιοτεχναι*, we may reckon an Iron Spider, mentioned by *Walchins* in his ninth fable, which was exactly made to the form and proportion of a Spider, and was also made to imitate his motions; which I confess was a singular piece of Art, if duly considered. And though these knacks are but little useful, and take up more time then needed to be lost, yet they discover a marvelous pregnancy of wit in the Artificers; and may be *experimenta lucifera*, if not *frugifera* hints of greater matters; of which Iron Spider I may say as *Du Bartas* speaks of the Iron Fly made by *Johannes Regiomontanus*, or *Fohn* of *Regensberg*, that rare Mathematician of his time,

O Divine Wit! that in the narrow  
wombe  
Of a small Fly, could find sufficient  
room  
For all these springs, wheels, coun-  
terpoize, and chains,  
V Which stood instead of life, and spur,  
and reins.

(186)

A Dutchman presented the Landgrave of *Hessen* (not many years since) with a Bear, and Lion of gold, that were hollow within, and each of the length of a man's middle finger, and every part and lineament of them answering truly to the proportion of the length, and both these did not exceed the weight of a French crown; but the Prince gave him three thousand Crowns in reward of his invention: A fair and Princely encouragement for ingenious Artists. *Claudian* hath an Epigram de *Quadriga Marmoræ*, like that of *Callicrates* (mention'd before) made of Ivory; and it is thus,

*Quis dedit innumeros uno de Marmore  
vultus?*

*Surgit in Aurigam currus, paribusque  
lupatis*

*Unanimes frænantur equi, quos forma  
Deremit*

*Materies cognata tenet; Discrimine  
nullo*

*Una silex tot membra ligat, ductusque per  
arsem*

*Mons patiens ferri, varios mutatur in  
artus.*

What

(187)

What artful hand into one shape did  
put

So many different shapes, and all well  
cut:

The Driver on his Chariot mounted  
fits,

His well match'd horses with wrought  
marble bits

And reins, are curb'd; and though  
each Figure varies,

Yet all are but one piece; one marble  
carries

Unfundered, all those shapes, the pa-  
tient stone

Cut into various forms, shews all in  
one.

*John Tredeskin's Ark in Lambeth*, can afford many more instances of this nature; and so can the Archives of sundry Princes and private persons, who have their *Pinacotheca's* and *Technematophylacia* for to preserve all rarities; among others, we finde great mention of *Bernard Paludanus* a Physician of *Enchuyssen* in *Holland*; at the sight of whose rarities a Traveller composed this following Epigram *ex tempore*,

*Orbe*

( 188 )

*Orbe novo & veteri rarum & mirabile  
quicquid*

*Dat natura parens, Artificisque ma-  
nus :*

*Una Paludani domus exhibet, ingeni-  
umque*

*Sublime ac studium testificatur Heri.  
Translated.*

**In the old world or new, what wonde-  
rous thing**

**Did art to light or nature lately bring,  
This *Paludanus* house doth shew a rare  
Proof of the owners sovereign wit and  
care.**

**Another you may finde touching this  
business in *Grotius* his Poems,**

---

**FINIS.**

---